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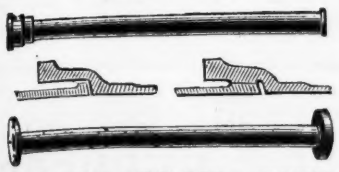

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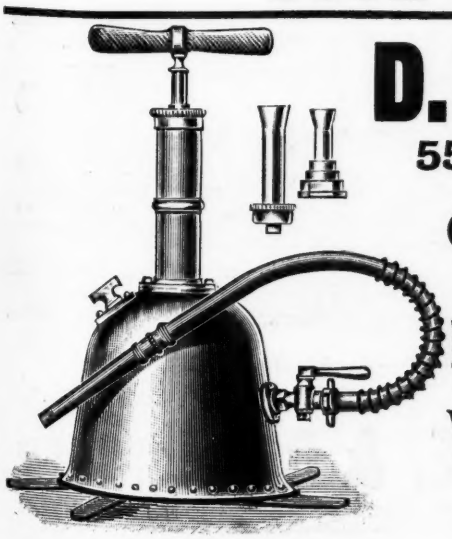

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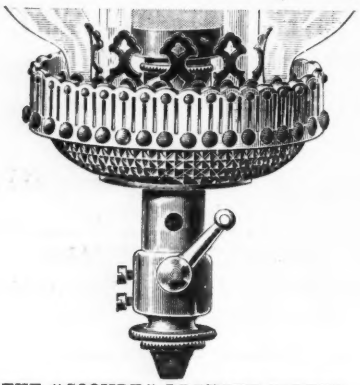

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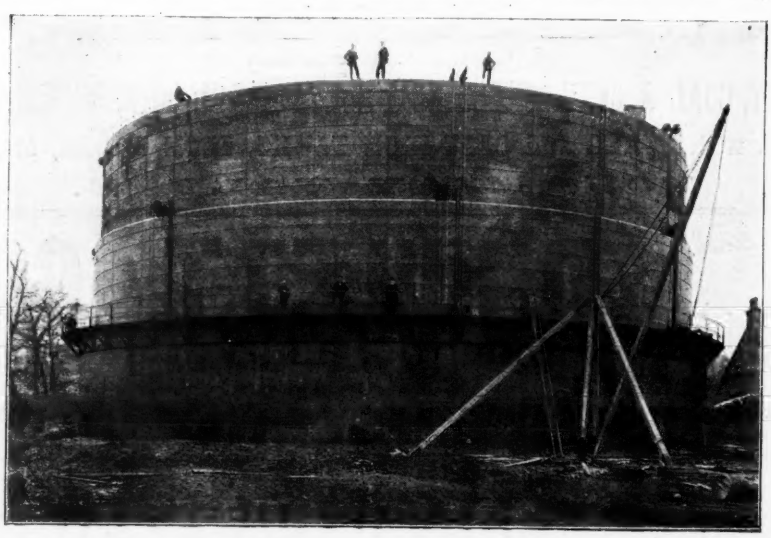

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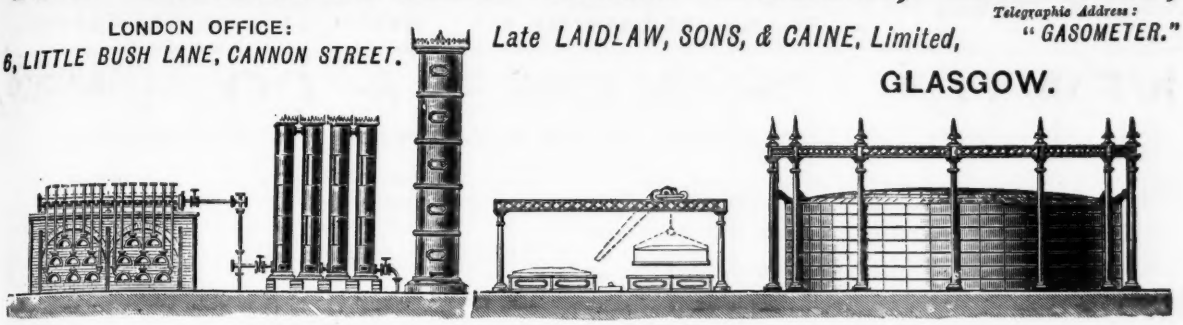

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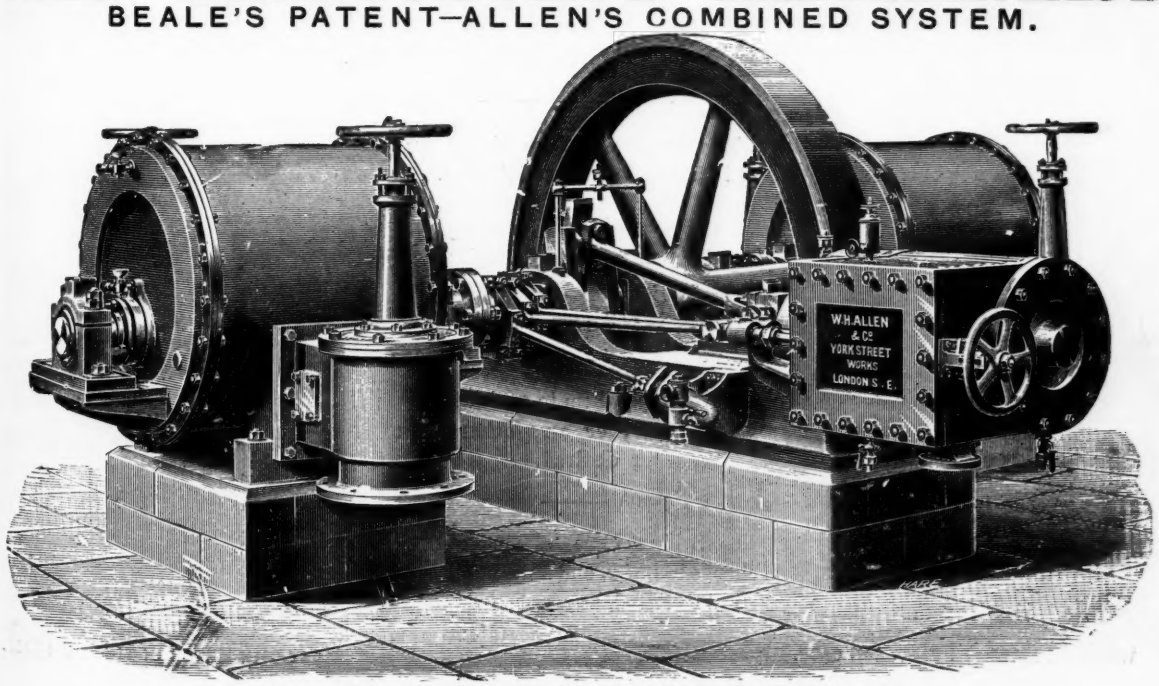

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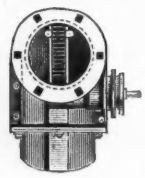

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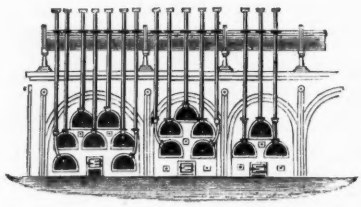

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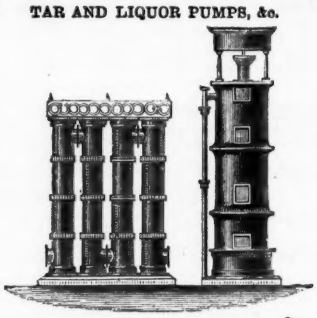

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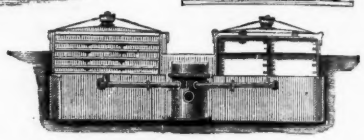

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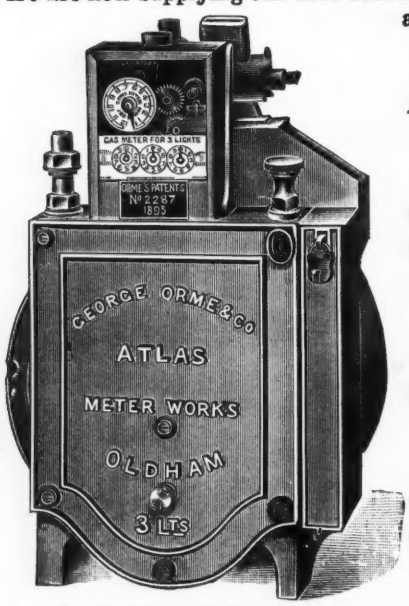

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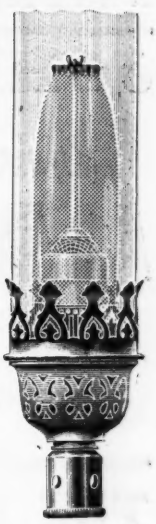

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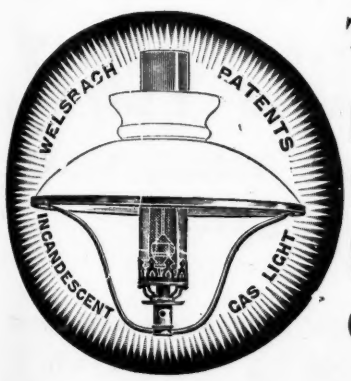

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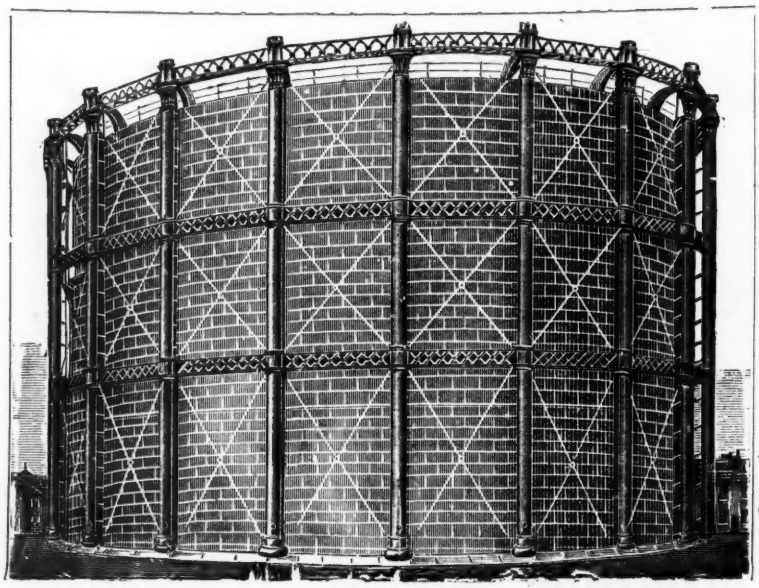

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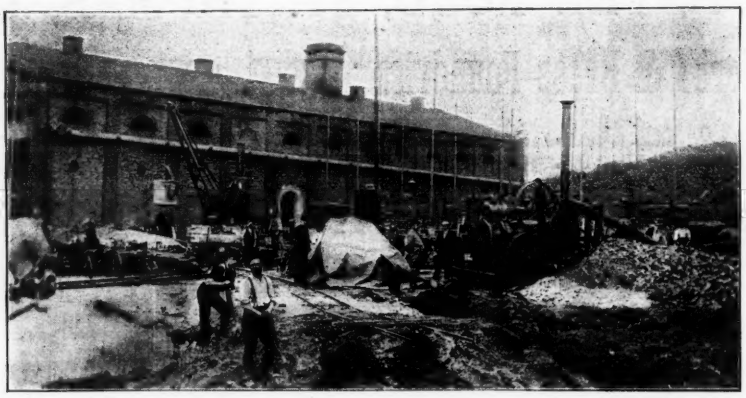

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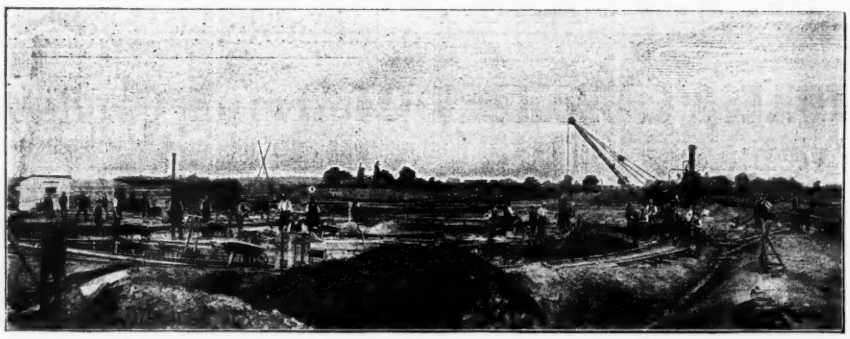

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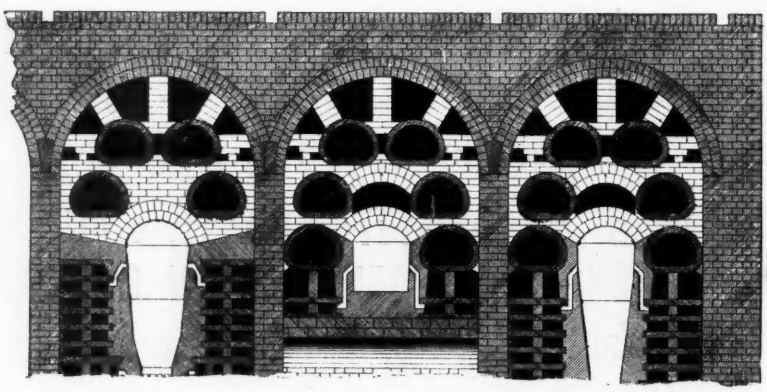

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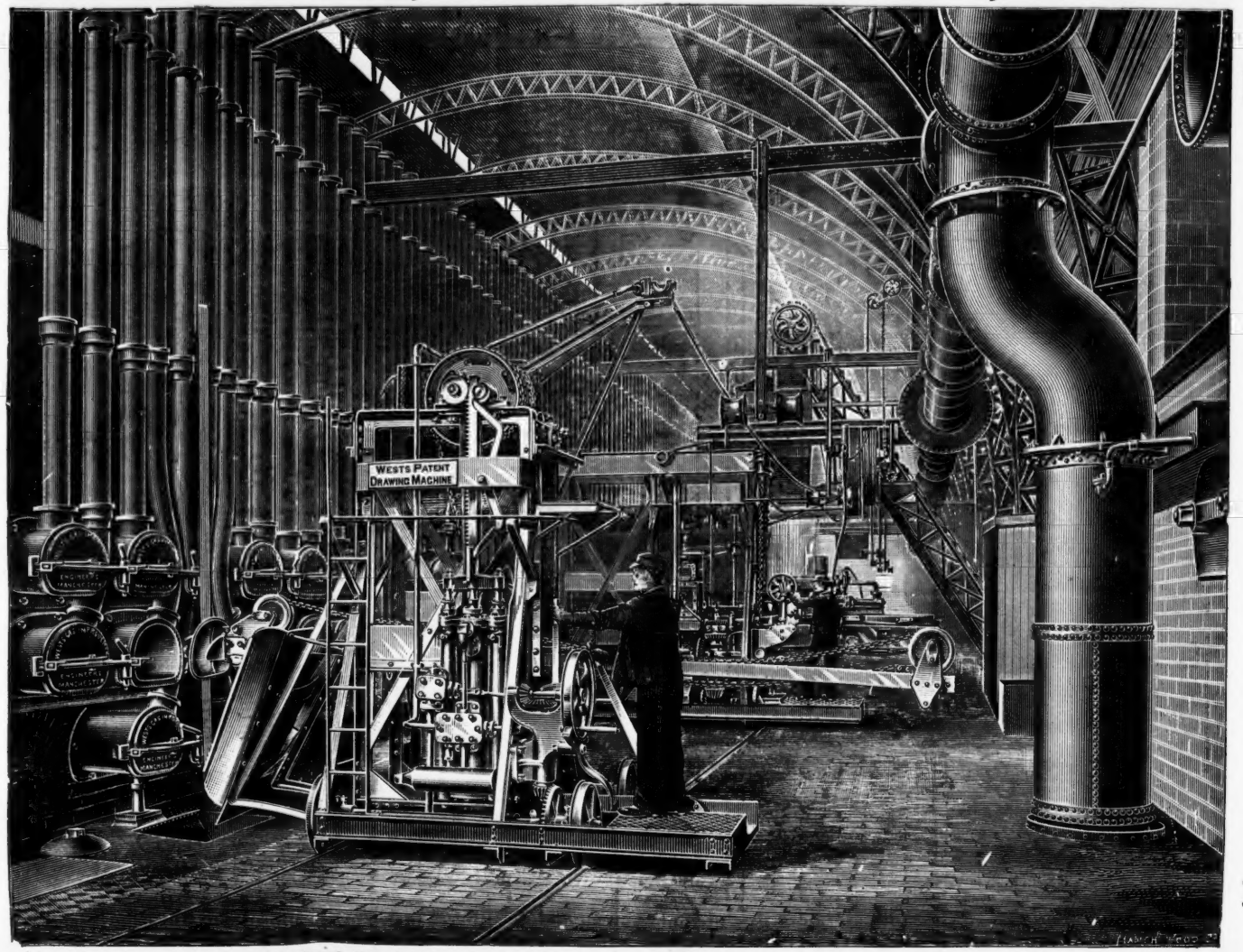

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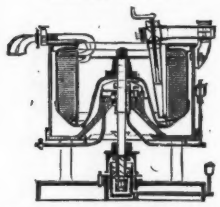

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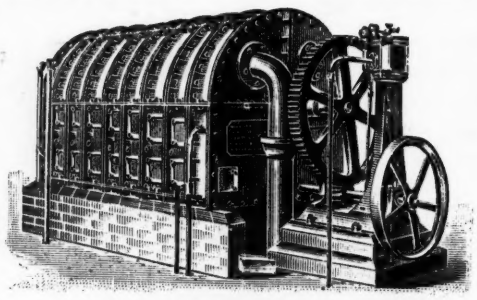

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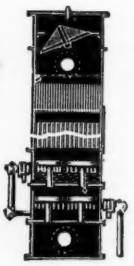

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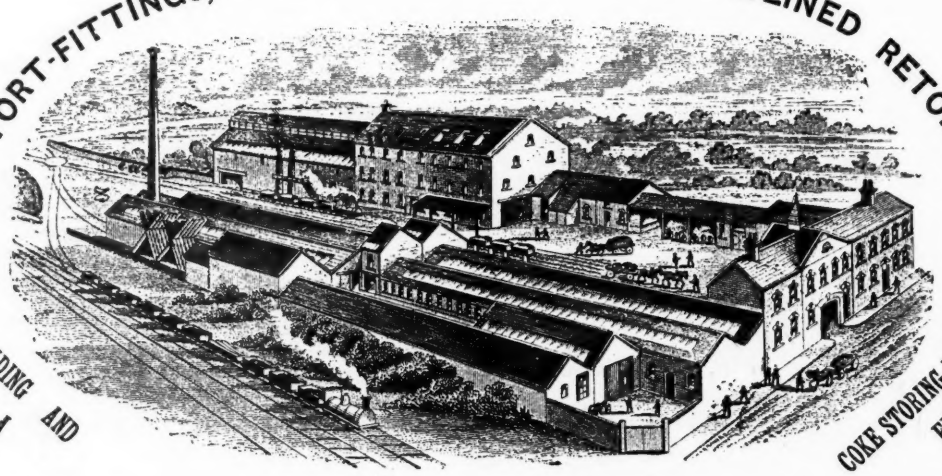

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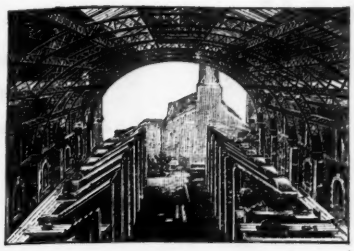

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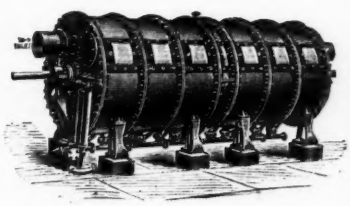

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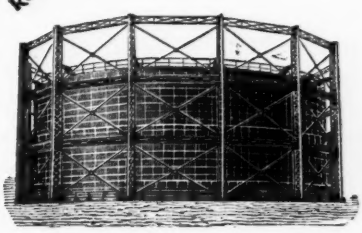

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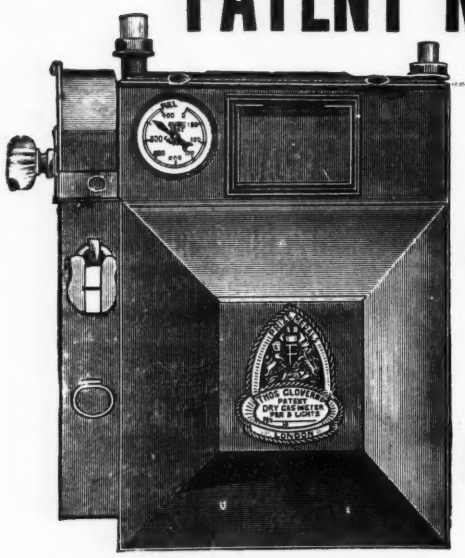

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TO CORRESPONDENTS.

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EDITORIAL NOTES.

The Report and Accounts of the Chartered Company.

THE Directors' report and the statement of accounts of The Gaslight and Coke Company for the past half year are given in the present issue of the "JOURNAL." The ordinary general meeting of the proprietors will be held on Friday. The preliminary announcement that the Directors will recommend the payment of a full statutory dividend after the rate of 12¾ per cent. per annum, which will only leave £45,747 to be carried forward, was calculated to arouse considerable curiosity as to the character of the report and accounts. This legitimate curiosity must now be suspended over the meeting; for the report does not contain the slightest reference to the Company's financial position. There is not a word in it about the depletion of the profit balance to meet the demand of an unearned dividend; and the only observations concerning the state of the undertaking which it vouchsafes tend to deepen rather than lighten the mystery of the position. With the enormous increase of 8½ per cent. in the gas consumption, the financial weakness of the Company becomes increasingly unaccountable, if the phrase is permissible; and the puzzle is not made easier of solution by the statement of the report that the net cost of gas is "slightly higher than "in the December half year, 1895." If increased business is to be attended by greater working expenses, what is to be hoped for in the future of this enormous concern?

Failing of enlightenment by the report, we must seek information in the accounts. These are sufficiently remarkable. The revenue from the sale of gas amounted to £1,441,482; being an increase of no less than £113,809 over the corresponding period of 1895. This does not look as if gas was on the wane in the Company's vast district. Residuals, as might be supposed, are bad. Coke fell from £228,438 to £201,905; and sulphate dropped from £53,098 to £44,256. Altogether, residuals brought in £320,647, against £355,961, or a loss of £35,314 upon what was a poor enough trade. The net gain in revenue was £80,089. On the other side, we find coal has risen from £555,206 to £579,268—an increase of £24,062. Wages (carbonizing) rose from £156,259 to £164,038; purification cost £1825 less; and repairs and maintenance were £8418 more. The total manufacturing costs show an increase of £39,076. The expenses of distribution, though heavy, are less than those for the corresponding period of last year; the total charge under this head being £123,587, as compared with £140,672. Rates and taxes went up another round £10,000. The total expenditure on revenue account shows an increase of £38,074. The balance carried to the net revenue account is £497,416, as compared with £455,402. After providing for all fixed charges, there remains a net balance of £417,934, which includes the sum of £108,897 brought forward. The actual net revenue for the half year is therefore £309,037; and to pay the dividend, £372,186 is required, which cuts the undivided balance down to £45,747, as stated in the report. The weight of coal and cannel carbonized was 1,025,781 tons, besides oil and spirit equivalent to 33,544 tons of cannel. The carbonization of the latter class of materials has been increased by about one-third. According to the balance-sheet, the value of "tar and ammoniacal liquor "and products" in store is taken at £251,786, and that of coke at £57,875. There is still a stock of 154,725 tons of coke to be disposed of.

It is difficult to find anything fresh to say about these accounts. What the Directors mean to do with regard to the squaring of the revenue with the dividend for the future will, it may be supposed, transpire on Friday. It indubitably looks, to the eye of an outsider, as if some new departure will have to be taken. The financial editors of some newspapers have at length begun to see that the last few half-years' doings cannot be indefinitely continued; and so there is some prospect of Friday's meeting being a little less perfunctory than usual.

Private Members' Bills.

THIS is now the season when the "private member" is apt to fancy himself of some importance in the British parliamentary system. He has balloted for his turn with his little Bill, and some of him have been fortunate enough to secure places which offer a reasonable prospect of coming

before the public in the enviable capacity of working legislators. It is chiefly to the private member that the world owes the cultivation of the crop of "hardy parliamentary annuals" which so rarely produce legislative fruit. Year after year members persevere with their well-meant "pennyworths"—the ordinary Private Bill is usually to be purchased of the Queen's Printers for this small consideration—and when in due course these ill-fated schemes are dropped for the year, it is only what was to have been expected, and does not militate in the least against their reappearance in identical form after the recess. If private members would only display a fellow-feeling among themselves, and agree to "make a House" to discuss and pass one another's Bills, more of these measures would become law. But if there is one thing more characteristic of the private member than his fondness for his own pet scheme of legislation, it is his absolute and complete indifference to the fate of everybody else's little Bill. Consequently, each year witnesses a repetition of the same time-wasting farce. At the beginning of the session, the private members have their days, when no Government business may be taken. They usually signalize their appreciation of this privilege by going home to dinner, and allowing the House to be counted out. Then after a few weeks the Government propose to appropriate all days for their own business; and the "howl of deprecation" rises from the benches which have presented a scene of desolation every private members' day from the commencement of the session. Indignant legislators write to their constituencies protesting that a callous Administration has prevented them from fulfilling their pledges to effect this or that reform. The local "caucuses" meet and pass resolutions on the subject; and so the imposture is perpetuated.

One of the very hardiest of the hardy annuals, to which reference has repeatedly been made in these columns, is the Bill intended to amend the Borough Funds Act, 1872, by making it easier for Local Authorities to promote or oppose Bills in Parliament. This is proposed to be effected by dispensing with polls of the electorate, unless not less than one-twentieth of the number of electors demand such an appeal. There could hardly be a more unsuitable time than the present, one would think, for asking Parliament to relieve Local Authorities of their obligations in this regard, seeing what wild use the London County Council have made of their free access to Parliament. It is an insult to the common sense of the Legislature to make such a pretence of keeping these proceedings of Local Authorities under the control of the electors, while setting up the requirement that 5 per cent. of their number must co-operate for the invocation of such power of control. Another Bill that has been seen before is an innocent-looking measure called the Steam Engines and Boilers Bill, which proposes that engine-drivers and stokers must be "qualified" in the manner provided. This is nothing more than a Trade Union scheme. It is to be presumed that the framers of the Bill would claim to be actuated by solicitude for the public safety; yet the measure is not to apply to "any boiler or engine used exclusively for "domestic, agricultural, or farming purposes, or to any "boiler or engine used in the service of Her Majesty, or "to any boiler or engine used by a railway company, or to "any boiler or engine used on board a steamship having "a certificate from the Board of Trade, or to any road "traction-engine or steam-roller." Consequently, it is intended only to tie the hands of factory and workshop owners, and put them at the mercy of what would soon become a close corporation of enginemen and stokers. We shall have something to say about other private members' schemes as occasion arises and the Bills appear.

Withdrawal of the Reigate Bill.

It is with much satisfaction that we are able to announce to-day that the "piratical" Bill of the Reigate Corporation, as we styled the measure last week, is not to be proceeded with. There will thus be no occasion for the rallying of those forces against the Bill which would unquestionably have been evoked by the sense of a common danger, if it had gone any farther. As was explained last week, we are really not concerned here with the merits of the proposals contained in the Bill; but having mentioned it as a specimen of the risks that statutory supply Companies have to run from ill-advised municipal action, it will be well to finish the subject by explaining the circumstances. It appears that the Reigate Town Council did not approach the Company with a view to the re-arrangement of any little matters that might have been recognized as constituting a grievance, but prepared and deposited their Bill, which was the only intimation the Company received that the Corporation had a case against them. Of course, the Bill, if not actually *ultra vires*, was of such a character that it could not possibly have passed. But the Company, in view of this evidence that the Corporation wanted a re-settlement of the water-rates and so forth, most prudently determined to meet the case with a conciliatory offer. The Board could have stood stiffly upon their statutory position, as some other Companies we wot of are in the habit of doing, and so defied the Corporation to do their worst. They could have pleaded ample justification for this attitude in the financial condition of the undertaking, which has been in existence for thirty-five years and has only returned a 5 per cent. dividend upon the ordinary shares for the last two years. The Board recognized, however, that it was better to live amicably than in spite with their Reigate customers; and so they found a way of making friends by volunteering to reduce the charges for domestic extras, which they had for some time felt to be higher than could now be maintained in Parliament. The offer was made conditional on the withdrawal of the Bill, and of course without prejudice. The Council proved to be amenable to reason; and so the trouble is ended, with credit to all concerned in the negotiations. Both the Corporation and the Directors of the Company are to be congratulated on the result, which will be a practical relief to the public, and will doubtless redound in the long run to the advantage of the Company. There is, unhappily, a wide diversity in the views entertained by the Directors of different statutory Companies of the position which their undertakings occupy in the community. Some Gas Companies which might be named are as though the administration were foreigners to the districts from which they draw their profits. Such undertakings may be irreproachably managed; but for all that they are rarely, if ever, in good odour with their public, and it is not difficult to perceive why. Tradition goes for much in this regard; and it cannot be denied that the traditions of not a few statutory Companies—Gas, Water, and Railway—are such as no private trader could possibly live under.

An American View of the Public Lighting of Paris and London.

General C. H. T. Collis, a Commissioner of Public Works for the City of New York, has been touring in Europe, and since his return home has given publicity to the impressions respecting the public lighting of London and Paris which we reproduce in another column. With regard to the gas lighting of Paris, the visitor's story needs to be corrected in respect of the not unimportant particular of the cost of the commodity, which he makes out to be $2·04 per 1000 cubic feet for private consumers and a little over $1 for public purposes. The actual price under the "Treaty" between the Paris Gas Company and the Municipality which we so often hear about is 30 c. per cubic metre for private consumption, and half this price for the public lighting. These figures represent in English 6s. 9d. and 3s. 4½d. per 1000 cubic feet, instead of the 8s. 5d. and rather over 4s. 2d. of General Collis. We do not know what the General means by saying that the hebdomadal instructions of the Paris lamplighters are "dependent upon the condition of the "atmosphere, the moon, and the treasury." His reporter must have misunderstood him here. He is quite justified in the observation that the brilliant street lighting to be seen in Paris is all for show, and that the back streets are badly lit. The reason is, of course, that gas is dear, and brilliancy in high places was ever better appreciated in France than humble efficiency in quiet corners. His testimony to the part played by the incandescent gas-burner in the improved lighting of Paris is valuable. It is one of the facts of the hour that in Paris the electric light has been eclipsed by the Welsbach light. With regard to the street lighting of London, General Collis is more than kind. He thinks the best London street-lamps not only ornamental, but he credits them with getting more light out of the gas than any others he has seen. His description of these triumphs of gas lighting is somewhat amateurish, but it will pass. He accuses the poorer regions of the Metropolis of being worse lit than similar parts of New York. We cannot check his opinion upon this point; but we gladly concede to this amiable critic of lighting a high meed of praise for keeping the requirements of the back

streets in mind when discussing the quality of city lighting in general. It is indeed by their worst lighting, rather than by their best, that the Local Authorities of the world's capitals should be judged.

Lord Penrhyn in Parliament.

The House of Commons showed itself in one of its unloveliest aspects on Thursday, when the relations of Lord Penrhyn with his quarry hands were made the subject of an acrimonious party debate, which taxed all the firmness and tact of the leader of the House to keep within legitimate bounds. It is gratifying to find that the view we took of this unhappy affair last week was substantially justified by what came out in the course of this debate. The chief factors in the question are Lord Penrhyn and the Quarry Committee; and it is only after the manner of "Labour" politicians that the cause of the latter should be exploited on platforms and in the House of Commons for all it is worth—not to the unfortunate labourers, but to the party wire-pullers. The employer in this case, being also a nobleman, was thought to be a splendid object for attack by a combination of the noisiest of popularity-hunting politicians; and therefore it was quite natural that Mr. John Burns should denounce the "aristocrat" as a "brutal, intolerant employer," and suggest that his workpeople had been too conciliatory and peaceable in refraining from pulling his castle down about his ears. How this operation would have tended to render Lord Penrhyn more tolerant of the Quarry Committee did not appear from the context; but this, of course, is a mere point of detail. The *crux* of the difficulty at Bethesda was disclosed in a speech made by Mr. Bryn Roberts, a Welsh member, who declared that "when men were appointed "as a Committee on behalf of the workmen, anything "they did or said in that capacity ought to be entirely "privileged. They were then not acting as servants of "the employer, but as agents of the workmen." This is the issue in the case; and it has been met by the equally candid declaration by Lord Penrhyn that he will not allow any Committee whatever to interfere with the working of his quarry, or come between him and his workpeople. There is no possibility for arbitration upon such a dispute, which can only be terminated by one side or the other giving way.

During the past few weeks, a great deal of contumely has been heaped upon Lord Penrhyn in regard to his conduct in this dispute; but it is not putting the point too strongly to say that every responsible employer of labour in a large way would be with him in his objection to the dual control system. As Mr. Douglas-Pennant said in the course of the debate, it is futile for employers to treat with Trade Union Committees as responsible bodies, because they are not amenable to proceedings for breach of contract. Even supposing that Lord Penrhyn, or any other employer of labour, were willing to recognize a Trade Union Committee, whether composed of his own workpeople or of outsiders, the responsibility of such a body only extends so far and lasts so long as the one party thinks fit. The employer has no effective remedy against an organization which at one moment presumes to an equality with himself, and the next may melt into nothingness. Last Thursday's debate, however, was not entirely thrown away. It enabled both sides to state their case; and the result upon the opinion of members of the House was reported in Saturday's "Daily Graphic" as follows: "From Lord "Penrhyn's point of view, the debate must be considered "a success. So much had been said and written on the "matter, so much political capital had been made out of "it, so much misrepresentation concerning Lord Penrhyn's "true position had gone abroad, that it was not surprising "that at the commencement of the debate feeling ran with "the men. To-day I should say Lord Penrhyn stands "well with a very large section of the House. . . The "latest gossip is that the great majority of the men are, and "have been for some time, anxious to meet and come to "terms with their employer; but that, for the purposes of "pending bye-elections and yesterday's debate, political "wire-pullers have kept matters open." So the wretched labourers are made use of as pawns in the political game; and those who are standing in the way of their earning good money from Lord Penrhyn will be careful to pay them only in wind for their subservience. The game of the politico-labour agitator is stale as the "confidence trick," but, like it, is of quite as enduring a quality as human folly itself.

WATER AND SANITARY AFFAIRS.

It would appear that a vigorous attempt will be made to press the Metropolitan Water Question to a decided issue in the present session of Parliament. There is an active band of agitators who desire to see the Purchase Bills of the County Council adopted by the Legislature, and these will not fail to make their voices heard. An important section of the London Unionist members is said to be urging on the attention of the Government the advisability of referring the Purchase Bills to a Committee, who shall be instructed to make certain inquiries; and a substantial majority of the Unionist members representing Metropolitan constituencies are alleged to be in favour of purchase. At a meeting of the London Unionist members to be held this week, Mr. Cohen is to move a resolution urging the Government to bring in their Water Bill at the earliest possible opportunity. The agitation on behalf of the Purchase Bills is receiving such assistance as may be derived from the support of the London Reform Union; and, under the auspices of this society, a meeting was held last week in the hall of Clifford's Inn, Fleet Street, when Mr. Passmore Edwards presided, and Mr. W. H. Dickinson, the Chairman of the Water Committee of the County Council, spoke. Mr. Dickinson claimed the water supply of London as the Council's "heritage," which it most certainly is not, seeing that it has far outgrown the jurisdiction of the Council. Perhaps the police are equally a heritage of the Council, together with the Guildhall and the Mansion House and all the civic properties. Mr. Dickinson considered it to be of the greatest possible importance that some settlement of the Water Question should take place at the earliest possible moment. So it may be; yet the settlement, when it comes, will not necessarily favour Mr. Dickinson's views, or give the water supply as a heritage to the Council, though the Clifford's Inn meeting unanimously approved the Purchase Bills.

The instruction which it is said the London Unionist members desire to see given to a Committee on the scheme of Purchase is that the Committee shall inquire "what is "the proper Metropolitan area, and what are the sources of "supply." This would be enough without anything else; and we are rather at a loss to see how such an inquiry can be satisfactorily tacked on to a consideration of the Purchase Bills. It reads suspiciously like the functions of the Commission which the "Pall Mall Gazette" recently stated would probably be announced by the Government when they in due course opposed the second reading of these Bills. We are now told that the object of the proposed inquiry as to the area is so to define the extent of the Metropolis as to ensure that all the cost of purchase is not thrown on the central districts. How "the "proper Metropolitan area" is to be made different from that already by law established, is another of the perplexities introduced into the question. If the Metropolitan boundaries are to be shifted in order to suit the exigencies of the purchase scheme, we hardly know what may follow. Certain representatives of London constituencies may be in favour of purchase; but if the present announcement is to be taken as a gauge of their intelligence in regard to the situation, we may hope that the Cabinet, with Mr. Chaplin at the head of the Local Government Board, are a little too discreet to be influenced by such advisers. As for pressing the Government to make haste with their Water Bill, we presume there is no desire on the part of its promoters to hold it back. But, let the Bill appear as soon as it may, there is little chance that it will become law this year. Amidst all that is said—for there is little done on this subject—we should like to ask why is any settlement of the London Water Question required? Will it be finally settled by a mere change of masters? What is there to gain? If Parliament will only give fair play to the Companies, the supply will be abundant, and certainly as cheap and good as anything likely to be obtained under a Municipality, or even under a well-qualified Water Board.

While recognizing the value attaching to General Scott's monthly reports on the Metropolitan Water Supply, we may observe that one report is usually and unavoidably very much like another. But the latest issue (for November) presents some departure from this uniformity, as will be seen by an extract to be found in another part of our columns. General Scott therein makes some observations which he considers necessary in consequence of certain inferences which might be drawn from a report

presented to the County Council by Mr. Dibdin a year ago. This report, it appears, has recently been under the consideration of the Local Government Board; and General Scott thinks some portions of it "might lead to "the conclusion that the generally successful efforts of the "officials of the Water Companies to carry out the work "of maintaining the cleanliness of the sand placed from "time to time on the filters are misdirected, and, "in fact, worse than useless." Our own impression is that there is some misunderstanding here. It appears to us that Mr. Dibdin did not object to clean sand being put on the filter-beds, but considered that it failed to act efficaciously until a film had been formed upon the surface. This agrees with the instructions drawn up three years ago by Professors Frankland and Dewar, and cited by General Scott, who explains that these instructions included, among other things, "that, after a filter has "been re-charged with water, an interval of rest should "follow during which sedimentation may take place, "causing the formation of a skin or layer of slime or mud, "which apparently constitutes the most effective portion "of the filter from the point of view of bacterial intercep-"tion." Clean sand does not make a good filter in the first instance, so far as the arrest of the microbes is concerned, but is a necessary ingredient by way of preparation. Mr. Dibdin quotes in his report an article which appeared in the "Daily News" of October, 1895, which points out that two or three years previously the Local Government Board, in accordance with "the best science of the day," insisted that a filter-bed could not be too clean, and found fault with the East London Company's filter-beds on this account. But Mr. W. B. Bryan, the Company's Engineer, strenuously opposed such views; knowing, as a matter of fact, that the water could not be effectually filtered through a new or clean bed. The "Daily News" declared that the mystery had quite recently been cleared up by Professor E. Frankland, Dr. Koch, and others. Certainly Mr. Dibdin is not blaming the Water Companies, though he may be making it evident that the Local Government Board at one time shared in the prevailing error of the day. There is really no point of difference at the present time, though there was at a date farther back. But it is to be regretted that the bacterial results effected by Mr. Dibdin, and especially by Dr. Klein, have been presented in a form calculated to disturb the public mind, though the facts of the case, when rightly understood, really establish the excellence of the water supply.

The Accounts of the London Water Companies.—The return of the accounts of the Metropolitan Water Companies to Sept. 30 and Dec. 31, 1895, was issued last Friday as a parliamentary paper. The total expenditure and net profit for the year in each case are as follows: Chelsea Company, £52,180 15s. 2d. and £72,595 9s.; East London Company, £156,941 3s. 11d. and £110,822 3s. 1d.; Grand Junction Company, £102,905 and £76,162; Kent Company, £73,722 1s. 8d. and £80,564 14s. 8d.; Lambeth Company, £125,556 11s. 1d. and £102,143 12s. 7d.; New River Company, £222,992 5s. and £245,990 7s. 5d.; Southwark and Vauxhall Company, £119,125 14s. 5d. and £47,628 10s.; West Middlesex Company, £121,550 and £96,163 8s. 9d.

The Transactions of the British Association of Water-Works Engineers.—We have received from the President and Council of the above-named Association the volume of Transactions for the past year—the first in the existence of the organization. It contains a report of the proceedings at the general meeting, held in London in April, when the rules framed by the Provisional Committee were adopted; and also of the annual meeting held at Nottingham in July, under the presidency of Mr. D. M. F. Gaskin, M.Inst.C.E., the Water Engineer of the town, a well-executed portrait of whom is given as a frontispiece to the volume. The technical matter constitutes a good first year's record of work. The book has been produced under the editorship of the Secretary (Mr. W. H. Brothers).

The "Gas Engineer's Annual."—We have received a copy of the "Gas Engineer's Annual and Gas Companies' Directory for 1897," edited by Mr. Charles W. Hastings, and published by Messrs. J. G. Hammond and Co., Limited, of Birmingham. This is the eighteenth publication of the "Annual," the contents of which are divided into two sections—the literary portion and the directory. In the former, the Editor has dealt with the subjects that are now receiving the special attention of those who are interested in gas manufacture; in the latter he has endeavoured to bring the information presented up to date. In this he acknowledges his indebtedness to the officials of the various gas undertakings, as well as to the columns of the "JOURNAL." Portraits of Mr. C. Stafford Ellery and Mr. W. Foulis, the Presidents of the two principal Gas Institutions, are given as a frontispiece.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 250.)

THE settlement which was in course of arrangement through the greater part of last week, tended to check fresh business on the Stock Exchange. Yet a good feeling prevailed throughout. This is due to numerous small investment purchases, coupled with the easier tone of the Money Market; for there is no increase in speculative business. Attention has again been chiefly centred on Home Railway stocks, which, in many instances, mark a sharp advance, despite a little reaction on Saturday. Consols and Colonial issues among investment stocks have been in request; and we have again to chronicle an advance among Gas and Water stocks, though business has been very quiet in this department all the week. With regard to the changes in the stocks of the Metropolitan Gas Companies, Gaslight 6 per cent. debentures are up 4, "K" preference 3, and 4½ per cent. debentures 1; while South Metropolitan has gained 1. There has been very little doing in the Suburban stocks, which are all steady. In the Continental division, Imperial Continental has risen 2; and Tuscan 5 per cent. debentures, 1. British rose ½; but Bombay receded ½; and Buenos Ayres, ¼. As to Water stocks, the market still shows a very firm tone; and five stocks mark an advance of 2 per cent., while Southwark and Vauxhall has gained 1 per cent.

The daily operations were: A small business was transacted on Monday in Gas stocks. Gaslight "K" was quoted 3 points higher; but no business was officially recorded, though Gaslight "A," which relapsed 1 per cent., changed hands at 320. Business was also done in South Metropolitan at 147½; Imperial Continental, at 224½; Continental Union, at 262; and European new, at 18½. Bombay old and new shares fell ½. In Water stocks, very little business was recorded; and prices remained unaltered. Tuesday again saw a paucity of business; and prices of both Gas and Water stocks continued unchanged. Dealings, however, were recorded in Gaslight "A" at 320, and in the 4 per cent. debentures at 142; Imperial Continental, at 224 and 222; South Metropolitan, at 149; Continental Union, at 261; European, at 25¾; Cape Town 6 per cent. mortgage debentures, at 58, and do. 4½ per cent. preference, at 11½. In Water stocks, Grand Junction "A" was done at 119¾; Lambeth maximum 10 per cent., at 273; and New River, "B," at 154½. Wednesday was again quiet, and hardly any business was noted; while the only change in prices was a decline of ¼ in Buenos Ayres Gas. Business was recorded in Gaslight "A" for the account at 319. In Water stocks, Chelsea marked 333½; East London, 331; Kent maximum 7 per cent., 216; and Southwark and Vauxhall ordinary, 154. There was a little more doing on Thursday. Imperial Continental ordinary rose 1½ per cent.; South Metropolitan, 1; and British Gas, ½; while business was recorded in Gaslight "A" at 321½, "H" 209, and 6 per cent. debentures 208; and British, at 57. As regards Water stocks, East London and Lambeth maximum 10 per cent. rose 2. Gas stocks on Friday were quiet; the only change being a recovery of 1 in Gaslight "A," in which dealings were recorded at 322, and in Commercial at 342. Exceptional business was done in Brentford consolidated at 292, and in the new stock at 227. South Metropolitan marked 150. A fair business was transacted in New River stock between 423½ and 425; and in Kent Water, at 345. Saturday was extremely quiet for both Gas and Water stocks; and prices were unaltered.

ELECTRIC LIGHTING MEMORANDA.

The Experience of Kingston-on-Thames—A Table of Electricity Supply Stations—Municipalities and Central Station Insurance.

THE borough of Kingston-on-Thames supplies an instructive example of electric lighting enterprise as carried on by a small municipality. The town is a small one; but the business part of it is extremely compact, and the suburbs are of a good and even superior residential character. On general principles, it might be supposed that central station electric lighting ought to answer rather better in such a locality than in a more scattered or poorer district; but experience shows that the Kingston Corporation made a bad speculation when they listened to the voice of the electrical charmer, and pledged the ratepayers to go into this business. The Borough Electrical Engineer—who, by the way, has been treated very ungenerously by the Town Council—has just presented his report upon the third year's working of the undertaking, which shows very fair results, so far as they go. In order to complete the equipment, however, and provide for the extended business which it is hoped will accrue during the present year, a further capital loan of £20,000 is required. When the matter came before the Town Council at the last monthly meeting, an animated debate arose on the condition and prospects of the undertaking. The Chairman of the Committee did his best to convince his colleagues that if all goes well, by the end of 1898 the station will be earning sufficient "to meet not only the works cost, but the repayment of principal and interest outstanding within £19." This can only be done, he assured the Council, if the additional capital is spent upon

the works and distributing plant; and he concluded his argument by declaring that the only alternative to such a course would be to sell the undertaking for what it would fetch. Another councillor displayed the reverse side of the picture; pointing out that the deficit on the last year's working was really £1326, and that although it seemed pretty clear that the additional capital was required, there is not much support for the hope that the growth of business will be commensurate with the increase in the capital expenditure. As it is, the Corporation themselves purchase half the current sold. The revenue account does not make any provision for depreciation, so that it is impossible to say what the financial results of the undertaking really are. The Town Council agreed to the recommendations of the Committee, but not without many misgivings with regard to the open capital account.

This week's "Electrician" contains the first edition of our contemporary's table of electric supply returns for the past year. It is complained that some of the undertakings are still reluctant to make a full disclosure of the extent of their business; and the diversity of the dates to which the municipalities make up their electric lighting returns, is very detrimental to the symmetry beloved by all compilers of statistical tables. Notwithstanding these drawbacks, our contemporary's figures are instructive, and furnish material for some interesting deductions. Several editions of the table will be required to keep pace with the successive appearances of the later returns, so that for the present it is not safe to generalize much on the statistics now put before us. Meanwhile, it is possible to endorse our contemporary's own conclusion that one of the keys to commercial success in central station electric lighting, as in all other businesses, is a low capital account. If after five or six years' working the capital expenditure of an electric lighting undertaking is much over 5s. per Board of Trade unit sold, the undertaking is seriously handicapped. The proportion of expenditure to receipts on revenue account, including depreciation, ought to be under 60 per cent. All the best London Companies make a respectable allowance for depreciation, besides repairs and maintenance; but the municipalities everywhere seem to be culpably remiss on this score. It is quite misleading to argue, as these local authorities do, that the repayment of loan is an adequate provision on this account. The table shows the futility of the idea that there is anything to be gained by substituting rubbish fuel for coal. The coal bill of the first Metropolitan Companies is little over ½d. per unit; and even the St. Pancras Vestry do not spend 1d. per unit for fuel.

The Municipal Electrical Association held a meeting in London last week, at which a paper on "Municipal Insurance" was read by Councillor G. Pearson, of Bristol. The origin of the paper was the action of the Associated Fire Offices in putting up the rate of insurance for central electricity supply stations from 5s. to 10s. 6d. per cent. The Corporation of Bristol are insured altogether to the amount of £730,098, and pay £1577 per annum in premiums. Like most other property owners, the Corporation occasionally grumble at the cost of fire insurance; and the action of the offices in respect to their new toy, the electricity generating station, seems to have been as the proverbial last straw to their patient endurance. Mr. Pearson accordingly went into the subject under the incitement of a sense of special injury done by the offices to the cause of municipal electricity supply; and he easily persuaded himself that it would be better not to insure central stations at all than continue to pay the rates demanded. Feeling, however, that it might be difficult to bring other corporators to the same way of thinking, Mr. Pearson finally concluded to put it to the Municipal Electrical Association whether each town ought not "to become its own insurer." As to the special case of electric light works, he thinks that "nothing would be easier than to obtain leave from the Council to set aside a fund equal to the profits of the electric light installation for a few years, to form an insurance fund; and even if the Council declined to set aside a sum equal to the whole profits, they may be induced at any rate to set aside a portion of the profits, in which case the day when ordinary insurances could be abandoned would only be delayed a short time longer." The observations of Mr. Pearson on this painful subject suggest several distinct reflections. His recommendation that the whole, or even a part, of the profits of a municipal electric lighting undertaking should be applied to the formation of a fire insurance fund must, in regard to the many instances where no profits are made, appear as a "counsel of perfection." The very idea that, where such profits exist, the whole of them would be required to form the nucleus of an insurance fund, is an indication of the utter hopelessness of the suggestion. Self-insurance is only practicable in the case of undertakings possessing large revenues and comparatively small and sub-divided fire risks. Thus a gas company having several manufacturing stations might very well undertake to insure them by a small annual allocation; but this cannot be done where all the eggs are in one basket. Mutual insurance has been tried and found wanting; and an unlimited expansion of municipal enterprise in this direction would certainly not be countenanced by the higher powers. It can be easily understood that the high rate now enforced for the insurance of central electricity supply stations is peculiarly obnoxious to those proprietors of such establishments who have been led to believe that electric lighting is safer than gas; but this is a feeling that will have to be lived through. We notice that the electrical journals, which at one time denounced the action of the fire offices in the strongest terms, are settling down into a "sombre acquiescence" of the inevitable. There is no denying that there have been some nasty fires at, and in connection with, electricity generating works; and the proprietors of these factories may be recommended to agree with the insurance authorities quickly, lest some worse thing happen to them.

PROFESSOR RAMSAY ON CHEMICAL STUDIES.

When such a fruitful worker and teacher as Professor W. Ramsay takes up his parable, and allows the world to know what he thinks to be the best way for people to learn things, it is desirable that this disclosure should be made to spread over as wide a field of study as possible. Not long ago, Professor Ramsay accepted an invitation to "assist," in the French sense, at the opening of the Gossage Laboratory of University College, Liverpool; and he then delivered an address full of matter of the deepest interest to all students, whether of chemistry or any other branch of science. As a chemist, of course, and speaking directly to chemists, Professor Ramsay started with sundry observations on some matters connected with laboratories. It is the laboratory, of course, that makes the chemist. But the chemist also creates the laboratory; and he is likely to be of little use in his generation unless he can get out of and rise superior to his creature. Failure in the latter respect is only too common, and is largely the reason why chemistry so often appears in the second place as a handmaid, rather than in the forefront as a leader of the Arts. While the young chemist is still in the stage of bondage to the laboratory, he is prone, as Professor Ramsay observed, to want to do something special—to strike out a line for himself, and make use of the skill and knowledge he has already acquired. He wants ideas, motives; and these impulses must, in the majority of instances, be supplied from without. Sometimes a young and inexperienced student conceives great thoughts; but such persons are rare. Here is the duty and the opportunity of the professor, who knows, as the most promising student cannot be expected to know, what are the gaps in the structure of science left by the hurry or carelessness of former builders, or in what neglected corners the germs of possible new developments may lurk. The crown of knowledge, in chemistry as in every other occupation of the intellect, is to know what is unknown, and where it lies.

Professor Ramsay went on to declare his preference for small and homely forms of study and work. He has a distaste for the educational establishment that is so huge as to have taken on the principles of the factory. Some such consideration must have struck many people, on seeing illustrations and reading descriptions of the big technical institutes of some European countries. Professor Ramsay contemns the labyrinths of passages and multiplicity of rooms in these palatial establishments, and frankly declares that he "prefers the gossip of a village to the County Council formalities of a city." Equally does he disdain the magnificently-equipped modern laboratory where the ordinary student finds everything laid on and ready made to his hand—except the brains to use the means provided so lavishly. "I do not advocate a reversion to the kitchen of Berzelius, or to the still more compact tray of bottles, pipe-stems, and candles of Wollaston; but I maintain that Heaven helps those who help themselves. To begin in the lap of luxury, leads to effeminacy and incapacity. I can imagine a latter-day student, plunged in the penury of a works' laboratory, weeping because no sulphuretted hydrogen is laid on; because to obtain steam, he has to boil water; because a vacuum cannot be obtained without manual labour. As an engineer should be able to make his own tools, so should a chemist. Starting with glass tubes, he should be able to extemporize a blow-pipe, and make the most complicated apparatus. He should be a reasonably good gasfitter and turner; he should be able to solder a joint; and he should be able to turn to account almost every apparently useless article. . . . Now, if the student has a shop at the corner, where all possible things may be procured; if he works in a laboratory where he has merely to turn a stop-cock and results pour out, he loses by not having passed through the ordeal of hard experience. A little time is lost; but here loss of time means gain in almost every other respect" This counsel strikes one as being peculiarly wise and well-timed.

Professor Ramsay drove his point still further home, by declaring his opinion that "students are as a rule much over-taught." He would not regard that place of study as a student's heaven where every learner had a teacher at his elbow, keeping him in the straight path, and guarding him from error. Taking it for granted that the object in training students in chemistry (as in most other sciences) is to teach them to discover new truths, and to form theories concerning the relations between old truths, Professor Ramsay concludes that it is best with this object to adhere to the natural method of "trial and error." It is quite true that "a student gains much more knowledge, much more experience, and much more confidence, if, instead of following a printed guide, he attempts, *propria motu*, to devise a new method (even when its failure stares in his teacher's face) and tries it. . . . The frequent elementary treatises which 'supply a long-felt want,' and which repeat the boiled-down truisms of chemisty, are very much on a par with the widely

advertised foods for infants." The student, once started, should be left to devise his own methods and make his own apparatus out of what lies nearest to his hand. Of course, like everything else, this pr ocess can be carried too far; "but let the help be given as help, and not as a set of methods and rules." It is quite right that this should be said; and the counsel is neither more nor less appropriate to the study of chemistry than it is to other studies which prepare men for their life-work. At the same time, it will not do to lose sight of the fact that educational systems exist primarily for the purpose of mitigating the tediousness and waste inherent in the natural method of "trial and error." It is said, with as much truth as wit, that the chief merit of our existing public school system lies in its exemplification of the benefits of self-teaching; but this is not what the system is maintained for at such enormous cost to those who are able to partake of its questionable advantages.

Lastly, Professor Ramsay asked what it is that gains a student a favourable position when he has at last to make a start in the world? Not, he answered himself, the possession of a high degree. The remark irresistibly recalls the dictum of another high authority as to the plentifulness of "learned asses" in the world. The best help for a young man, in Professor Ramsay's opinion, is "the good word of his teacher." And the principal reason for this is that the teachers have studied and valuated his character during years of intercourse. "That is the examination through which we all have to pass; a practical examination which lasts a lifetime." The speaker suggested that it might be well if science degrees could be awarded "by what, after all, is the only criterion of merit in the world—the judgment of those of our fellows capable of forming an opinion." The best reply to this, is to remind all concerned in the matter that academical degrees are really valuable only as a short form of testimonial of what a man has done. They cannot indicate what he is yet capable of doing; nor, except to a small extent, what the man really is.

On the subject of the application of chemistry in the Arts and Manufactures, Professor Ramsay observed that, in technical chemistry, "a knowledge of methods is indispensable. Engineers should work hand in hand with chemists; for many chemical processes depend for their success on the smooth working of the plant by which they are realized on a large scale. What yields good results with a gramme often fails with 1000 kilogrammes, owing to difficulty of treatment, which means expense." This is the source and centre of the difficulty that so often springs up between chemists and engineers. The two sciences start from such widely separated points in the study of the same material, that it is no easy matter to find any considerable space of common ground where they can meet and be mutually helpful. Yet such ground exists in numerous instances, the tale of which is being extended every day.

To return, however, to Professor Ramsay's advice on the subject of chemical studies, we are glad to welcome him as another friend of the poor, solitary, almost unaided student. After all that University courses and technical guild classes can effect to popularize the study of difficult sciences, the question of the progress of knowledge must rest with the students themselves. There is more than a little danger lest the establishment of teaching centres in our large towns, and the equipment of laboratories and class-rooms in connection with them, should tend to create and foster the notion that these advantages are absolutely necessary to the pursuit of knowledge. There is with the report of these things, a temptation for the isolated student to think it useless for him to try to improve himself by the diligent and intelligent use of the homely aids at his own command. This is particularly the case in the gas industry, the most salient peculiarity of which is that it must be carried on by separate establishments, staffed by men who can in the ordinary way have little of the help and comfort of associated study and labour among fellow workers. As we have asserted on previous occasions, and now repeat, this isolation of the workers in gas need not condemn the humblest of them to ignorance of the best that is being done, or can be done in their industry. If they cannot get to the University, the University, in the shape of the technical press, can be brought to their own doors; and the man who works with a will, and with sufficient intelligence for his needs, though he starts from a village, may hope to finish in the place he is best fitted for. The life-long examination of which Professor Ramsay spoke, is that which tries us all; but the complaint of the young and aspiring is that they do not get enough of it. Here, again, the truth of the French saying that "all things come to him who knows how to wait," is frequently made manifest. It is not those who have waited long in lonely places; but those who have misused and wasted the period of waiting, upon whom the condemnation of the examiners in the world's university eventually falls. And for such failure there is no reparation.

The Acetylene Industry.—The growing importance of acetylene is evidenced by the fact that two publications—one in French and the other in Italian—have been started on the Continent to record its progress. A Society has also been formed, under the presidency of M. Trouvé, to deal with technical matters affecting acetylene and the industries allied to it. They will meet monthly, and will shortly issue a publication recording their proceedings.

WATER BILLS FOR 1897.

(*Continued from p.* 179.)

The Dumfries and Maxwelltown Water Bill proposes to confer additional powers upon the Commissioners, who were originally incorporated in 1850. The water limits are extended; and the qualifications and method of electing the Commissioners are revised—the Act of 1852 being repealed. It is proposed that the Commissioners shall cause pipes to be laid so far as not already laid, and water to be brought through all streets or roads along which houses are built within the limits of compulsory supply. For the purpose of providing for the better distribution of the water supply among the inhabitants, the Commissioners are to require owners to lay service-pipes and take a supply of water for every house within the limits of compulsory supply. Domestic and public water-rates are to be levied; the former not to exceed 6d. in the pound of the rateable value, with a minimum charge of 1s. per annum. The public water-rate is not to exceed 2d. in the pound.

The Leeds Corporation (Water, Tramways, and Improvement) Bill contains a part relating to water supply. Additional lands are required, constituting a drainage area (the Valley of the Washburn) which is to be held by the Corporation for the purpose of protecting the source of their water supply. Owners or commoners injured by the protective measures are to be compensated. For the purchase of land and for other water-works purposes, the sum of £410,000 is to be borrowed, repayable in 60 years.

The Loughborough Corporation Bill is to authorize the construction of an impounding reservoir in the valley of the Black Brook, in the parish of Sheepshed, to be completed within eight years. A clause is inserted to facilitate the cleaning of aqueducts, by permitting the water to be temporarily discharged into any available watercourse. It is desired to borrow £65,000 for water-works purposes, repayable in 60 years.

The Manchester Corporation Bill contains a clause to sanction the laying of a conduit or main water-pipe connecting the Audenshaw and Godley reservoirs. The appointment of Committees of the Corporation to transact measures or purposes within the statutory powers of the Corporation, is to be legalized. It is proposed to sanction the levying of a betterment charge on property benefited by street improvements. The sum of £210,000 is required for water-works purposes, of which not exceeding £100,000 may be applied to hydraulic power purposes, repayable in 60 years.

The Newark Corporation Water-Works Bill is to extend the limits of supply over a number of parishes. New works are to be authorized, for the distribution of water in the added district from the pumping-station of the Corporation in the parish of Farnsfield, to be completed within five years. For the purchase of land and the construction of the works described in the Bill, the sum of £11,230 is to be borrowed, besides £23,693 for carrying out the extensions authorized by an Act of 1891. The Corporation are not to bore for water within the added limits; and other corporations are to be similarly restrained.

The Newport Corporation Bill contains a part relating to water. Additional water-works are to be constructed, comprising an intake reservoir to be formed by an embankment across the valley of the Castroggy Brook, in the parish of Newchurch. The powers of the Act of 1887—transferred by the Act of 1888 to the Corporation—of constructing the Llanvaches reservoir, are to be revived. The powers of the Act are to be exercised within eight years. All water-rates in the borough are to be made payable half-yearly in advance. The sum of £150,000 is to be borrowed for water-works purposes, repayable in 60 years.

The Nottingham Corporation Water Bill is to extend the limits of supply to include the parishes of Calverton, Woodborough, Lambley, Oxton, and Epperstone; in which the rates charged are to be not exceeding one-fourth part more than those chargeable within the borough. No extra rates are to be charged in certain parishes, so long as the Corporation pumping-stations exist in these localities. Three such pumping-stations are to be authorized, to be situated in the parishes of Oxton, Woodborough, and Boughton. The new works are to be completed within seven years. The sum of £300,000 is required for water-works purposes, repayable in 60 years. Fresh provisions are to be made with regard to the sinking fund.

The Reigate Corporation (Water Charges) Bill is to alter the rates chargeable for domestic water supplies within the borough, under the East Surrey Water Company's Acts. The proposed charges are set out at length, and range from 10s. per annum for a house of the rateable value of £7, to 4½ per cent. for houses exceeding £90 rateable value. The price of water supplied to the Corporation for sanitary purposes is not to exceed 8d. per 1000 gallons. Water sold by meter to private consumers is to be charged at 1s. per 1000 gallons. Certain of the East Surrey Company's enactments are not to apply to the borough; and a title to be supplied from a particular water-works is to be given to certain consumers.

The Torquay Corporation Water Bill is to enable the Corporation to acquire lands in the watershed from which they derive their water supply, and to take further powers for the prevention of pollution, at an estimated cost of £40,000. The

additional lands required are to be taken within ten years. The sinking fund is not to be started for five years from the passing of the Act.

OBITUARY.

The death is announced, at the age of 81, of Mr. W. Tipping, J.P., of Brasted Park, Sevenoaks. Deceased was a Director of the Sevenoaks Water Company, of which he was one of the original shareholders.

PERSONAL.

A marble timepiece, with suitable inscription, was presented to Mr. John Merrill on the 28th ult., by the workmen at the Gaythorn station of the Manchester Corporation gas undertaking, congratulating him upon his appointment as Manager, and thanking him for his past services to the sick club.

A change is about to take place in the management of the Cambridge Gas Company's works by the resignation, owing to impaired health, of Mr. O. J. Weeks. It may be remembered that Mr. Weeks held the position of Engineer of the Company until illness compelled him to retire in 1889, when he was succeeded by Mr. W. Duesbury. On the death of this gentleman in 1893, however, the Directors asked Mr. Weeks to again undertake his former duties; and though these have been discharged to the entire satisfaction of the Directors, he feels that, in his present physical condition, they should be entrusted to other hands.

Coke in Germany.—Stocks of coke in Germany are becoming so reduced that the German Coke Syndicate are stated to have purchased 5000 tons of coke in England for shipment to Spain and Belgium.

Sanitary Institute Lectures.—The Secretary of the Sanitary Institute (Mr. E. White Wallis) has issued the prospectus of the twenty-third London course of lectures and demonstrations for sanitary officers and students. They have been arranged for the special instruction of those who are desirous of obtaining a practical knowledge of sanitary requirements and regulations; the subjects selected including those scheduled for the examinations of the Institute. In connection with the lectures, which will be delivered by well-known authorities, there will be visits of inspection to works. The course of nineteen lectures will be opened on the 15th prox., at the Parkes Museum, Margaret Street, W., by Mr. A. Wynter Blyth, M.R.C.S., Medical Officer of Health for Marylebone, with an introductory lecture, the admission to which will be free; and on the last Mondays in March, Professor Corfield and Dr. Priestley will deal with the subjects of water supply, and lighting, warming, and ventilation.

British Association of Water-Works Engineers.—We learn from the Secretary of this Association (Mr. W. H. Brothers) that a general meeting will be held at the Westminster Palace Hotel on the 13th inst., under the presidency of Mr. D. M. F. Gaskin, M.Inst.C.E., of Nottingham, to elect members and associates, to receive the audited accounts, and to transact general business. A paper will be read on "Water Supply, Drainage Areas, and Compensation Water to Riparian Owners," by Mr. W. Watts, M.I.M. and M.E., F.G.S., &c., Water Engineer to the Oldham Corporation; and it will be followed by a discussion. Mr. J. A. Paskin, M.Inst.C.E., Water Engineer to the Halifax Corporation, will move resolutions to the effect that it is desirable that the instructions issued to house-to-house water inspectors by local authorities should be of a uniform character throughout the country; and that general statutory powers should be conferred on such authorities to make bye-laws for the prevention of waste, misuse, undue consumption, or contamination of the water belonging to them, and as to the employment of plumbers to perform plumbing work in connection with such water supply, and to enforce the bye-laws by means of pecuniary penalties or otherwise.

Prize Competition for Coke-Stoves.—The German Association of Gas and Water Engineers decided at their last annual meeting to devote the sum of 5000 marks (nearly £250) to a prize fund having for its aim the improvement of coke-stoves. The regulations under which the money will be awarded have recently been published, and full details may be obtained of Herr K. Heidenreich, 19, Thurmstrasse, Berlin. The Association have offered the award in the hope of bringing about a more general use of gas-coke stoves for dwelling-rooms, and thereby helping to abate the smoke-nuisance in towns. The sale of broken coke which has lately become customary at gas-works has tended to make the use of these stoves more popular. The competition is not confined to new types of stoves; but existing patterns may, provided they conform to the conditions imposed, be entered. Drawings and descriptions of stoves which are to participate in the competition must be sent to the Business Manager of the Association, Herr K. Heidenreich, at the above address, by Sept. 1, 1897. The judges will then select those stoves which are to be admitted to competition; and it is anticipated that Nov. 1, 1897, will be the date by which the selected ones will be required to be sent in. The sum of 5000 marks may be awarded to one stove, or distributed among several exhibits, at the discretion of the judges.

NOTES.

Lighting and Extinguishing Gas by Electricity.

A new system of lighting and extinguishing gas by electricity, the outcome of the combined labours of M. Egraz (the manager of the gas-works at Aix-les-Bains), M. Château, and Dr. Guyenot, was brought under the notice of the members of the Société Technique du Gaz en France at their meeting last June. Since then it has been on trial for both indoor and outdoor lighting; and for the past few months it has been employed in connection with the public lamps in one quarter of Aix-les-Bains, where its operation was lately inspected by a number of gas engineers. The system is described and illustrated in the Society's Transactions for the past year, as well as in a recent number of the "Journal de l'Eclairage au Gaz." All the burners in a district are connected with a conductor coming from some source of electric energy; low-tension currents being employed, even for a large number of burners. The essential parts of the apparatus attached to the burners are (1) the distributor, which takes the place of the ordinary tap; (2) the electrical appliance which actuates the distributor and lights the gas; and (3) the lighter itself. The distributor consists of a closed chamber communicating with the gas-main and also with the burner-tip. In this chamber there is a steel ball, which can either rest upon the opening leading to the main, and so close it, or be raised so as to make a passage for the gas. Above the ball is a piece of soft iron resting upon it; and above this a bar of steel. The lighter consists of a piece of platinum wire. Round the burner is placed an induction coil; the stem of the burner, containing the steel bar, filling the space usually occupied by the core of the coil. The appliance works as follows: A current is sent into the cable, and as soon as it reaches the coil the steel bar is magnetized, and attracts the piece of iron and the ball, which remain suspended. The orifice of the gas-inlet is thus opened, and the gas which passes to the tip of the burner is ignited by the incandescence of the platinum wire of the lighter. Extinction is effected by the de-magnetization of the steel bar, the effect of which is the closing of the gas-inlet by the falling of the ball into its former position. Two forms of the appliance are in use—one for the simultaneous lighting of a district, and the other for the lighting of portions in succession; and it can be adapted to interiors. For public lamps, the lighting operation is effected either from the gas-works or from some suitable position in the district. For buildings, press-buttons are employed, like those used for electric bells.

Expanded Metal and Concrete Construction.

Attention has been lately directed to the advantages of what is known by the name of "expanded metal" for certain structural uses. Recently a number of tests were made with various applications of expanded metal in the construction of fireproof flooring. The expanded metal was buried in concrete composed of granite chips and cement mixed in the proportion of 3 to 1. An interesting circumstance of the tests was the inclusion of a modified Monier arch, in which the usual iron rods were replaced by expanded metal of 3-inch mesh. This arch had a span of 12 feet, and was 4 feet wide. The centring had a rise of 13 inches, and the whole thickness of the concrete was 3 inches at the crown and 4 inches at the haunches. This arch did not break until a gross load of 28 tons 16 cwt. in lead ingots had been piled upon it—an average load of 12 cwt. per square foot. This was remarkable strength for so light a construction; and it goes to show how much structural toughness may be gained by the judicious addition of a very little weight of iron to a concrete floor or partition. As it was, the Monier floor did not prove so strong as a floor constructed upon the Golding system of long-span flat slabs carried upon channel-irons. These tests were undertaken in connection with the flooring contracts for the New Brighton Tower, which is being built under the direction of Sir Benjamin Baker; Messrs. Maxwell and Tuke being the architects. The experiments were not conclusive, but were regarded as satisfactory for the expanded metal construction, which was calculated to be 9 per cent. stronger than the Monnier construction, with an advantage on the score of cost.

The Preparation of Cyanides.

In a summary of "Developments in the Manufacture of Cyanides," published in the "Chemical Trade Journal," the conditions of the production of cyanides are described. It is stated that a good deal of potassium ferrocyanide (yellow prussiate) is now made from gas liquor. Carbon and nitrogen are capable of combining directly to form cyanogen; but this is only at a very high temperature, which can be lowered if an alkali is present. Many patentees have essayed to frame a commercial process on this principle, but with indifferent success. At the temperature of a blast-furnace, a proportion of cyanogen is formed which can be absorbed by passing the gases through an absorbent alkaline liquor. In the production of anthracene, some residues are obtained which contain much "carbazol," a nitrogenous compound. When this is melted with caustic potash, potassium carboazolate results, which decomposes at a bright red heat into potassium cyanide and free carbon. There is said to be a fairly good yield of potassium cyanide by this process. Calcium carbide also is convertible into calcium cyanide by heating in a furnace in a current of nitrogen. From

this potassium cyanide may be made by boiling it with a solution of potassium carbonate. Again, when an electric spark is passed through a mixture of nitric oxide and acetylene gases, hydrocyanic acid is formed, which may be converted into potassium cyanide by passing it through a solution of potassium carbonate.

Shaft Sinking by Freezing.

An interesting application of the Poetsch system of sinking foundations in water-bearing strata was recently described by Mr. G. E. R. Thomas to the Western Society of Engineers (Chicago). It being desired to sink a shaft at the Chapin Iron Mines, in Michigan, through soil known to contain a layer of quicksand, operations were begun by surrounding the site of the proposed shaft with a circle of 10-inch cast-iron main-pipes, sunk to a depth of 104 feet, so as to pierce through the wet strata. This was done entirely by mechanical power. The pipes were provided with a steel cutting edge at the bottom, like a trepanning instrument. The top end of the pipe was fitted with a toothed wheel, into which a pair of pinions, driven by steam power, geared. Inside the pipe, a high-pressure water-pipe passed down and discharged under the cutting edge. All that remained was to start the gearing and the water, and let the pipe eat its way vertically into the earth as deeply as it was required to go. When the boring was done, an 8-inch pipe, closed at the end, was introduced into the hole, and lowered to the bottom, after which the larger pipe was removed to a fresh spot. When the ring of pipes was thus complete, every 8-inch pipe had a 1¼-inch pipe put into it, open at the bottom, to introduce the cooling liquid, which thus flowed to the bottom and rose up in the annular space between the pipes, to the cooling-tank. Thus a continuous current of the refrigerator (chloride of calcium in solution at a temperature of −31° Fahr.) was caused to circulate through the pipes, in this instance at the rate of 15,000 gallons for the entire system every 33 minutes. The fluid was cooled by a Linde refrigerator using anhydrous ammonia. The result was that the ground round and between the ring of pipes froze into a solid mass, so that the quicksand was temporarily converted into a kind of sandstone, needing heavy charges of dynamite to break it up. After the work of sinking the shaft through the frozen ground was completed, it took several weeks for the frost to disappear; so that there was plenty of time for the cement to set. Mr. Thomas was very enthusiastic with regard to the merits of the process, which he declared to be the shaft-sinking method of the future, certain to be universally used for getting in foundations in wet ground and where quicksand abounds.

COMMUNICATED ARTICLE.

SULPHATE OF AMMONIA.

By H. H. Cousins, M.A., South-Eastern Agricultural College, Wye.

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II.—Relationship to Soil.

Solubility in Soil.—Though sulphate of ammonia is not so greedy of moisture as nitrate of soda, it is yet a readily soluble substance; and a gallon of cold water will maintain more than a pound of sulphate of ammonia in a state of solution. It is a common statement in books and in the agricultural press "that sulphate of ammonia is not nearly so soluble as nitrate of soda, should be applied early, and, on account of the slowness with which it dissolves in water, is not so readily washed out of the soil." This is not only a misleading statement, but also inaccurate. If lightly harrowed in, and mixed with the surface soil, sulphate of ammonia must, under normal conditions, pass almost immediately into solution. Even so low a percentage of soil-moisture as 2 per cent. would mean that the top 4 inches of soil contained 3000 gallons of free moisture capable of at once dissolving more than 7 tons of sulphate of ammonia per acre! We must then conclude that this fertilizer goes into solution in the soil-moisture practically at once; and, like all soluble salts, it is then diffused throughout a considerable range of soil.

Retained in Soil.—Fertile soils have a most remarkable power of absorbing and retaining ammonia. If weak solutions of nitrate of soda and sulphate of ammonia be filtered through a bed of fertile soil, it will be found that, while the nitrate has filtered through without appreciable loss, the ammonia will have been more or less completely retained by the soil. The power possessed by different soils of absorbing ammonia varies considerably; and it is a somewhat striking fact that those soils which are found in practice the most productive and fertile, are also possessed of the highest absorptive power for ammonia. Thompson and Way, who first established this important fact, were able to show that the absorptive power for ammonia was measured by the amount of clay and humus in the soil, and that neither pure sand nor chalk was possessed of any retentive powers *per se*. The action would seem to be a chemical one, and to be essentially due to a combination of the ammonia with the hydrated silicates of alumina—the chemical basis of clay—and with the complex organic compounds derived from decaying organic matter, commonly termed the humus of the soil. It is important to note, however, that, in the case of sulphate of ammonia, the absorptive power of a stiff loam well enriched with humus, is of very little account if chalk be deficient. If agricultural chemistry has one plain fact to press on English farmers with insistent force and earnestness, it is this—*the absolute necessity of lime* for the successful and economical working of all systems of manuring. No one who has studied the problems of the effect of manures on soil can avoid the conviction that hundreds of thousands of pounds are wasted by English farmers every year through neglect of this first essential of all fertility. I would urge as an axiom in the practice of rational manuring, that *lime is the foundation of fertility.* Dung or green crop, shoddy or sulphate of ammonia, all are practically wasted if lime be not present in the soil to secure their conversion into digestible and wholesome plant food.

Changes Occurring in Soil.

Action of Chalk.—In any soil in fit condition for the growth of a good and remunerative crop, there will invariably exist a certain minimum of chalk. This substance is more susceptible to chemical change than any other mineral constituent of the soil; and it readily reacts with sulphate of ammonia. No sooner has a dressing of this latter substance been absorbed in the soil water, than it is carried into immediate contact with countless particles of chalk existing in the solid soil itself, and also meets with dissolved chalk in the closest molecular contact. An exchange of constituents takes place, to a large extent as follows: (Chalk) carbonate of lime + sulphate of ammonia = carbonate of ammonia + sulphate of lime. The sulphuric acid used by the gas-works for converting the pungent ammonia gas into a solid article of commercial possibilities, is thus seen to unite itself in the soil with lime, and to eventually result in the production of sulphate of lime (plaster of Paris). Analyses of soil-water show that, after a dressing of sulphate of ammonia, the drainage water is considerably reinforced with sulphate of lime, and, in consequence, has become *harder*. The change is never completed in this definite direction; but a certain proportion of unchanged sulphate of ammonia passes on to the lower levels of soil and again undergoes this general modification. In a good soil, the actual loss of ammonia, by being washed beyond the sphere of root action, must be so small as to amount to *nil*. In sandy soils, and all soils practically destitute of lime, the loss might, under certain circumstances, be considerable.

Loss of Ammonia by Volatilization.—I have just stated that the first change which sulphate of ammonia undergoes in the soil is that of becoming converted into carbonate of ammonia—a substance familiar to all under its common name "smelling salts." This is a volatile substance, and readily disappears into the air as gas, if exposed for any length of time. Some danger of loss in this way has been predicted by scientific authorities; but it is reassuring to find that, in practice, losses of ammonia by volatilization are so small, and little likely to occur, that the danger may be quite disregarded. We must remember three facts which explain the reason of this security: (1) Clay and humus absorb the ammonia, and retain it. (2) Ammonia is rapidly converted into non-volatile nitrates during the growing season. (3) The soil seldom gets dry enough to expose the dissolved ammonia to serious risk of volatilization. Experiments by M. Girard in France gave the following results: A soil containing 2 per cent. of lime was dressed with 4 cwt. of sulphate of ammonia per acre, and compared with a corresponding dressing of farmyard manure; the manure in both cases being lightly covered over with soil.

Manuring.	Loss of Ammonia per Day per Acre.
No manure	*nil.*
4 cwt. sulphate of ammonia	20 grains.
Farmyard manure	64 grains.

The only contingencies that are likely to occur in practice which would probably cause serious loss of ammonia are two: (1) Applying sulphate of ammonia as a top-dressing in contact with exposed and recently applied lime or chalk; (2) mixing basic slag and sulphate of ammonia, and sowing them together. Every practical man is aware that these are blunders that the veriest ignoramus would avoid as involving certain and serious loss of ammonia by volatilization. When the lime or basic slag has been once incorporated with the soil, no loss of ammonia will result from a top-dressing of sulphate of ammonia.

Nitrification.—Although plants are able to feed on salts of ammonia in the absence of nitrates, it has been found that nitrates are the most economical, digestible, and desirable form in which nitrogen can be presented as a plant food. The operation commonly known as "nitrification" is a process of oxidation, whereby ammonia is converted into nitric acid in combination with a base like lime or potash—*i.e.*, transformed into nitre. The last stage in the decay of a dead animal or plant is nitre; and this again is the first stage in the recreation of mineral matter into living, growing tissue. This change of ammonia into nitrates has been largely investigated during the last ten or fifteen years; and we now know that the operation is carried out by the living agency of germs. The work of Schloesing, Warington, and Winogradsky has recently been brought to bear on the practical details of farming by M. Dehérain.

Conditions Affecting Nitrification.

Germs Necessary.—No conversion of ammonia into nitrates can take place without the presence of the special organisms

concerned. Ordinary cultivated land is always thoroughly inoculated with the nitrous and nitric organisms; and healthy conditions are alone necessary to secure their effective operation.

Air Necessary.—The nitric fermentation can only be accomplished by free access of air. Badly tilled, sour, or water-logged soil, is an impossible medium for nitrification; and recent research has shown that, under such unhealthy conditions, instead of a conversion of ammonia into nitrates, the valuable nitrogen is given off as nitrogen gas into the air. Good cultivation, which experience has proved to be the most effectual method of securing good crops, is thus seen in the light of recent discoveries to be really concerned with the production and maintenance of a healthy, aërated, and porous tilth, in which soil organisms can grow and work freely.

Potash, Phosphates, and Lime Necessary.—The germs require a general and mixed diet; and though they do not require any organic matter whatsoever, these three fundamental mineral plant foods are of absolute necessity to them. A well-nourished soil, therefore, not only feeds a crop directly, but, by promoting nitrification, exercises a very important secondary action.

Chalk an Essential.—No point is of greater importance in practice than this. Thousands of tons of dung and other manures containing nitrogen are wasted, and the nitrogen evolved as gas into the air, instead of providing nitrates for the sustenance of plant life, simply and solely because no chalk remains in the soil to assist the busy bacteria in converting the manures into nitrates. High manuring always means a great demand on the chalk in the soil. Note the extreme hardness of the water draining from a heavily dunged soil, and then remember that even a typical chalk soil may, in the end, have been so exhausted of its chalk in this way that insufficient supplies remain for free and efficient nitrification.

Moisture Essential.—When the soil-moisture is as low as 2 to 3 per cent., nitrification is practically at a standstill. Hot damp weather promotes nitrification; and in tropical countries, the rate of nitrification is astonishing in the case of a warm, damp soil.

Temperature.—The most favourable temperature for nitrification is 99° Fahr., at which temperature Schloesing found it to be ten times as active as at 57°. In hard frosts, the action practically ceases altogether; but, during a considerable portion of our average English winter, the change is generally progressing slowly and regularly.

As a summary of these various conditions, we may conclude that, when sulphate of ammonia is applied to a soil in fit condition, both as to porosity and composition, it is converted into nitrate so rapidly that its practical effect on a growing crop is that of small and continuous doses of nitrate, and that usually the change is decidedly more rapid than the rate at which the hungriest crop could absorb the nitrate produced.

TECHNICAL RECORD.

THE INSTALLATION OF CARBURETTED WATER-GAS PLANT AT BIRMINGHAM.

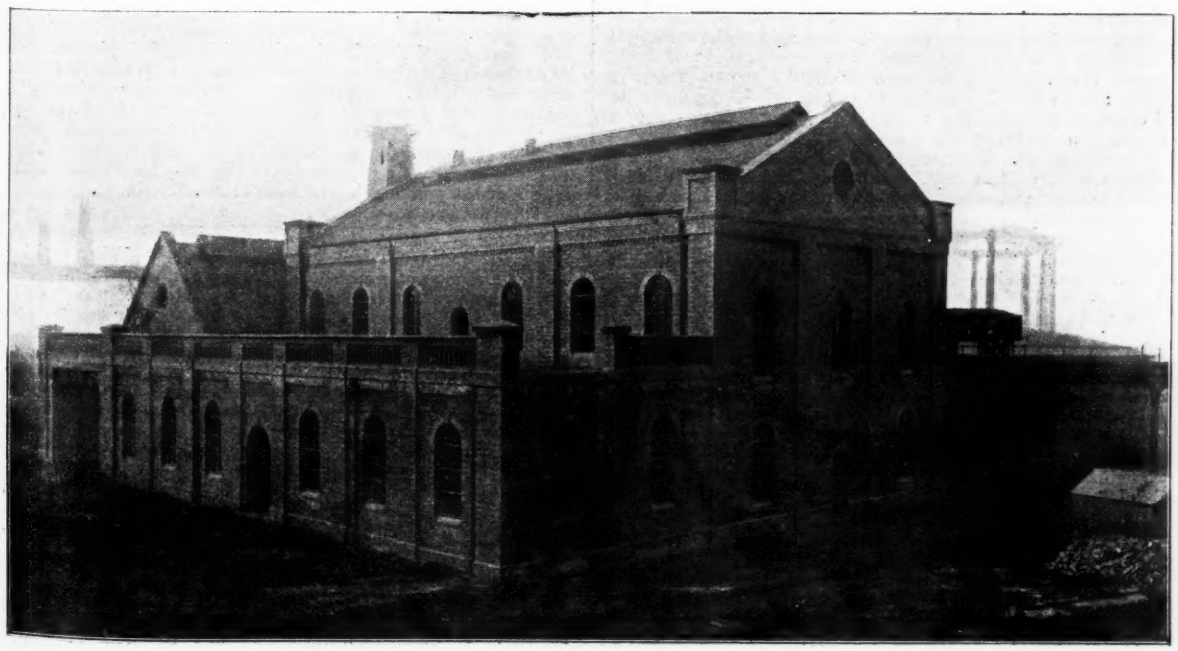
The Birmingham Corporation have recently completed an important addition to their gas-works by the installation of a carburetted water-gas plant, designed for the ultimate production of from 8 to 10 million cubic feet per day; the present plant now in working order being of sufficient size to manufacture one-half that quantity. This installation was rendered necessary by the rapid increase in the demand for gas in the extensive area supplied by the Corporation. Soon after the Blackburn plant was completed, the Gas Engineers to the Birmingham Corporation (Messrs. Hunt and Hack) made a thorough inspection of it, and also received reports from their chemists upon the results of repeated scientific investigations of the product of the plant. After a thorough examination of the leading plants on the market, a contract was entered into with the Economical Gas Apparatus Construction Company, Limited, for one of their Merrifield-Westcott-Pearson types of plant, capable of making from 4 to 5 million cubic feet per day.

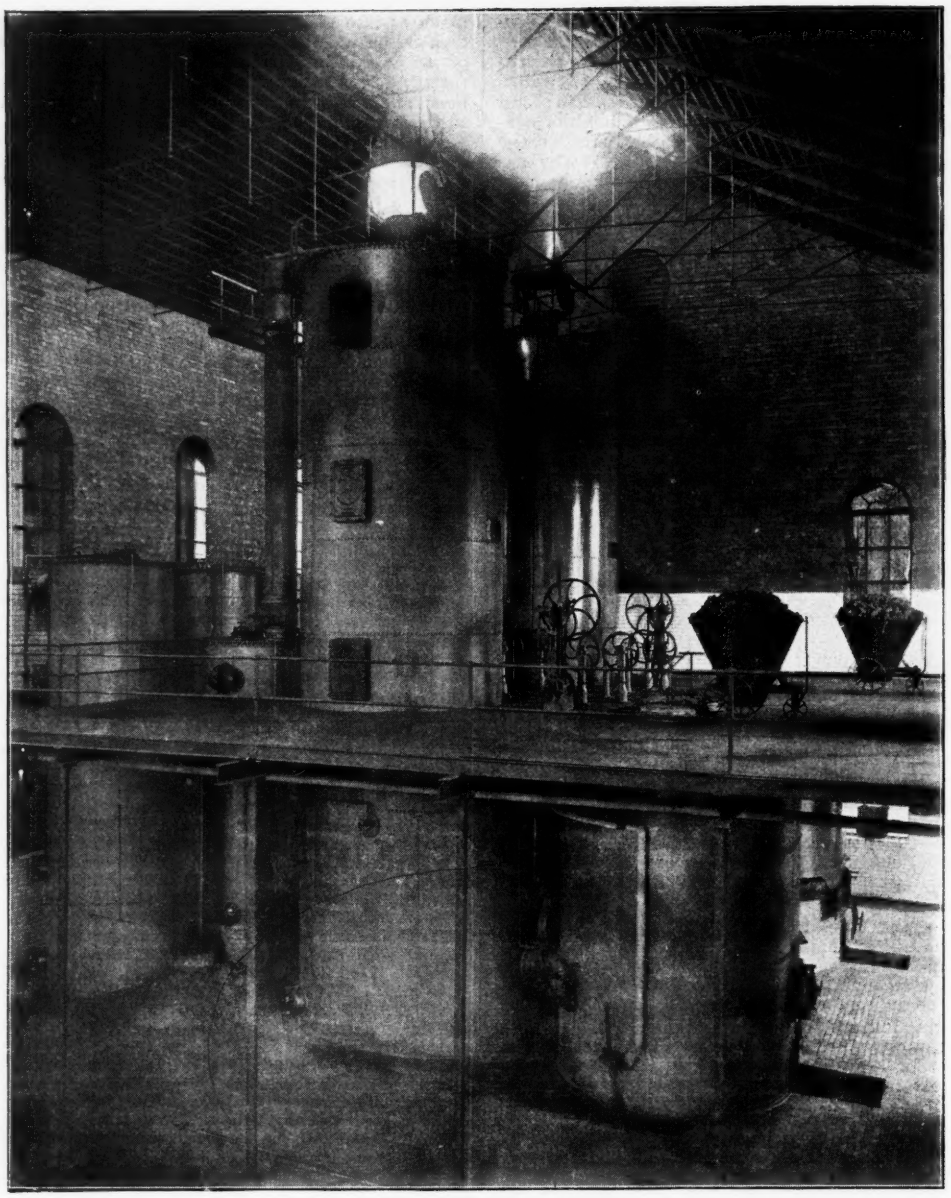
There are two plants of exactly the same capacity and size—one at the Windsor Street works, and the other at the Saltley works. The order for these, including buildings, oil storage-tanks, purifiers, relief holders, &c., and everything complete, was given in the early part of 1896; and gas was being made in the fall of the year. This is probably the shortest time in which the completion of such a large installation of water-gas plant and machinery has recently been accomplished; the credit for this being mainly due to the untiring energy of the Corporation Engineers.

The illustrations given on pp. 234-35 have been prepared from photographs of the plant; the first showing its general construction. The plant at each works has been arranged in two sections, which can be used together or separately. Each set is designed to produce 1,000,000 cubic feet of gas per day; but one has already made about 1,200,000 cubic feet—showing that the designers allowed sufficient margin over and above their guarantee. The plant at each works (with provision for ultimate duplication) consists of two generators, oval in section, two superheaters and fixing chambers, two washers, two oil-heaters, two scrubbers, and two condensers.

The second illustration is a view of the machinery room, which contains two blowers and engines, each of sufficient size to work the two sections of plant, two of Messrs. George Waller's engines and exhausters, each capable of passing about 100,000 cubic feet of gas per hour (that is, each of sufficient size for the two sets of apparatus when running together), duplicate oil-feed pumps, &c. At the Saltley works, there are two Lancashire boilers, and at Windsor Street two Babcock and Wilcox boilers of about 140 actual horse power each, all fitted with the most modern forced draught devices, and arranged for utilizing residual tar for fuel purposes. There is also at each works an oil storage-tank, having a capacity of about 400,000 gallons, relief holder, tar-separator, lift, &c. The new buildings which have been erected for the plant at Windsor Street and Saltley consist of a generator-house (space being left for duplicating the plant), machinery rooms, and boiler-house, with provision for additional machinery and boilers.

This installation (which is the largest single order that has ever been given in Europe for carburetted water-gas plant) is self-contained, and comprises several special features. The sets are of unusual size; one, as already mentioned, having made as much as 1,200,000 cubic feet of gas per day. Among the specialities may be mentioned the oval shape of the generators,



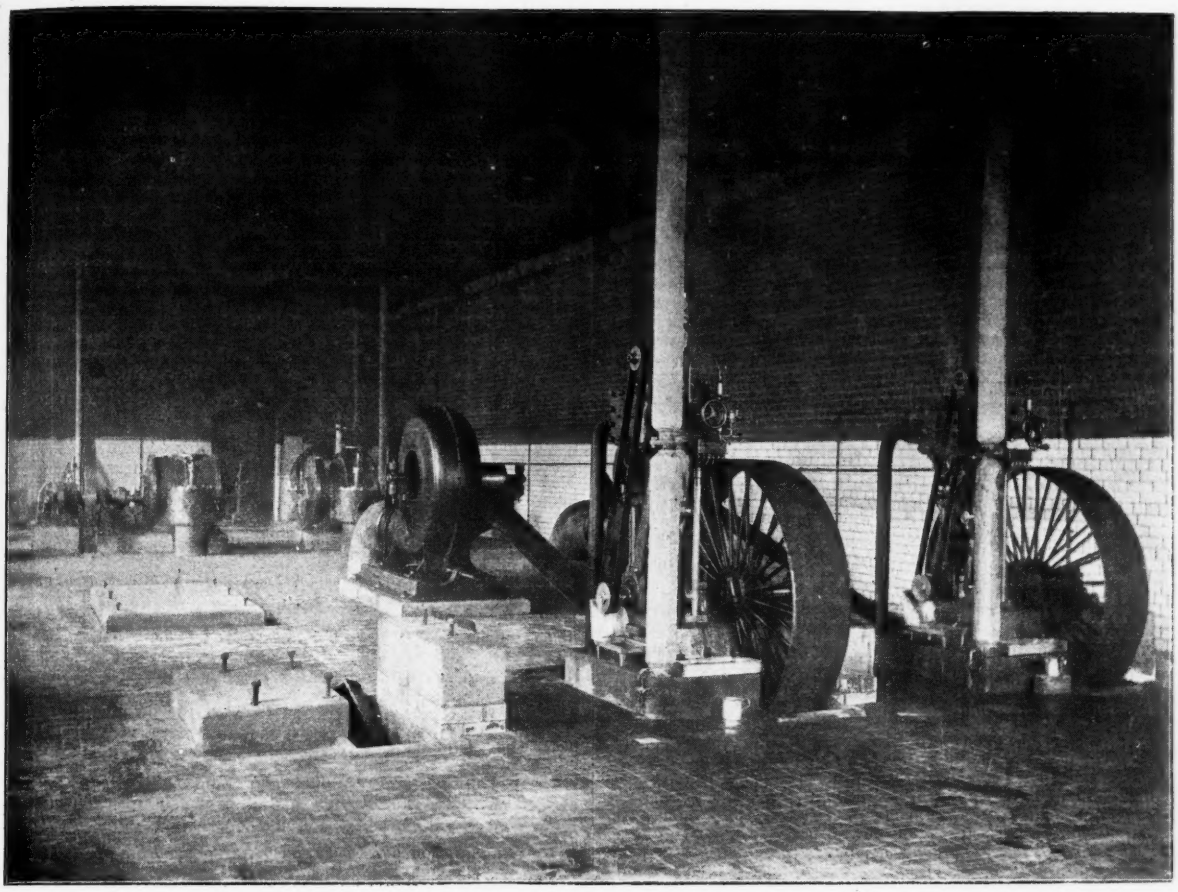


with two coaling-doors to each, and fitted with special arrangements for reducing the amount of carbonic acid in the crude gas to the lowest possible percentage. The superheater and fixing chamber is of the combined form, specially designed internally for the most efficient permanent gasification of the heaviest and cheapest oils that are in the market; and this is one of the prominent features of the plant—its successful gasification of all grades of oil. Its success in dealing with these oils has been demonstrated over and over again in Canada and England, where a heavier and more difficult oil has to be dealt with than in the United States, and where this type of plant, it is claimed, is giving superior oil results (for which it was specially designed), as well as economical working in respect to fuel, besides making practically no lamp black.

The entire plant is operated from a working floor, which is of iron, and about 15 feet above the ground level. The coke is brought to this point by slightly different means at the different stations to meet their peculiar conditions, and is dropped from specially designed buggy hoppers into the generator as occasion requires. On this floor, the gas maker operates the entire plant, having at his hand, within a few feet, every valve controlling the apparatus—namely, the valves regulating the gas outlets from the generator for an up or down run (these work automatically, one never being open without the other is closed); the different valves admitting air to the generator, superheater, and fixing chamber; the stack valve (which permits the utilized producer gas to escape when blowing up the heats); the steam-valves; and the oil-valves. There is also, well within seeing distance, the dial of the oil-meter, the battery gauges, and the clock. It may be interesting to note that there have been built about 229 sets of the various types of the combined form; but the type erected at Birmingham is the latest development of all other classes of carburetted water-gas apparatus, and seems to be fulfilling all, and in some instances more than, its designers anticipated.

We understand that the Gas Committee and Engineers of the Birmingham Corporation are well pleased with this method of water-gas making. As previously noted in the "JOURNAL," it has only been by means of the new plant that they have been able during this winter to cope with the unusually large output of gas, which one day in December was 30¼ per cent. larger than was ever before experienced. The whole work was carried out under the personal supervision of Mr. Merrifield.

The Botley Naphthalene Preventing Process.—When noticing, on the occasion of the visit of the Incorporated Institution of Gas Engineers to Hastings last year, the process devised by Mr. C. E. Botley, Assoc.M.Inst.C.E., the Engineer and Manager of the Hastings and St. Leonards Gas Company, in association with his son and assistant, Mr. C. F. Botley, for the prevention of naphthalene deposits by the "carburation" of gas, we remarked that somewhat more severe climatic conditions than had then lately prevailed were required to put the process to a proof beyond the region of cavil. Such conditions have lately obtained; and it is gratifying to learn that the apparatus has worked with entire satisfaction. The weather in the week ending the 23rd ult. was a severe test; and a proof of its capabilities is afforded by the fact that, out of 7000 consumers, the complaints of short supply, &c., only amounted to twenty—an average of three a day—and six of these were caused by water. With regard to the public lighting, the failures on account of obstructions caused by naphthalene did not exceed 0·25 per cent.—in other words, only about four lamps in 1520 per day. This happy state of things has been highly appreciated by both the Company's staff and the consumers.



CORRESPONDENCE.

[We are not responsible for the opinions expressed by correspondents.]

Choked Ascension-Pipes.

Sir,—Allow me to express my thanks to you for opening your columns to a discussion on "Choked Ascension-Pipes," and also to the gentlemen who have come forward with suggested remedies.

I am a great sufferer from this intolerable plague, and am of opinion that there is some mysterious influence concerned that has not been fully recognized by either of your correspondents. In my case, the chokes come only in winter—not a sign of such a thing is seen in summer; and yet my foul-mains are amply large (15 inches diameter, for a make of about 40 millions yearly), my exhausters are set to maintain a vacuum of half an inch, and this is maintained in the hydraulic main, as shown by gauges fixed at various points. Another curious fact is that some days the retorts are all leaking, and choked pipes incessant, and perhaps the next day, under apparently identical conditions, the retorts are all tight, the retort-house clear of smoke, and choked p'pes comparatively rare. I use three varieties of coal, and have satisfied myself that the chokeages come indiscriminately with either sort used exclusively or in mixed quantities. My retorts have generator furnaces; and the choked pipes have been much worse since the alteration from direct firing. But reducing the heats to what the latter used to give, does not afford much relief.

I have given a trial to all the suggestions offered by your correspondents; but, up to the present, without any appreciable success. My ascension-pipes are 6 inches, tapering to 5 inches, and the choking takes place at all points from near the mouthpiece to the end of the dip in the hydraulic main. I have laid on a supply of liquor, and keep a constant stream flowing through the hydraulic main, which is in separate lengths for each bed of retorts.

The works have been generally very successful, and the price of gas is low; but unless I can get a cure for choked ascension-pipes, things may not be so rosy in the future as they have been in the past.

Jan. 28, 1897. "Southerner."

Sir,—I hope "Country Manager" has so far benefited by the advice given in your columns on the 19th and 26th of January as to have regained his tranquillity of mind. But in fear lest the differences of the "doctors" may have driven the patient from distraction to worse, I venture to give him a few words also.

Tar, &c., forming into solid bodies and obstructing ascension-pipes is brought about by heats too high for the coal used, driving off tarry compounds in so thick or dry a condition that the flow of gas cannot carry it forward to the hydraulic main. The evil is augmented by friction *en route*, which is often unduly increased by inadequate area of pipe and needless length and sharpness of bends therein. If the pipes do not adequately accommodate the volume of gas passing off from the earlier part of the charge (which is loaded with most of the tar), the tar is affixed to the pipe by the pressure, and dried hard on by the subsequent flow of hot dry (and poor) gas.

If "Country Manager" would, from this point of view, recall to mind every alteration in his working details between summer (when he was all right) and winter, he would be able to locate his defects much better than anyone else could do for him from the meagre details he gives. I do not see that anyone could give him any useful advice as to altering the plant until he knew what the plant is, and to what extent financial conditions may limit the application of perhaps too expensive remedies. If in this case there have been increased heats, or weights of charges for winter demands, relief might be obtained by dividing the work of each retort into an additional charge—say, instead of four six-hour charges, put in five charges of 4h. 48m., taking care not to burn the charges too long. Striking the lids a little earlier will often effect a cure at the cost of a very small proportion of poor gas. A little cannel is also often found to be a partial remedy. It is a good practice to have in each ascension-pipe a nipple (capped), for convenience of ascertaining the pressure at various stages of carbonization. With this it could soon be ascertained if the charge were too large, or the carbonization too rapid for the pipe.

Uneven heating of the retorts may be a cause of stoppage. It is easy to get heat at one part sufficient to produce 11,000 cubic feet of gas per ton, with its consequent liability to obstruction, and only have an average of 10,000 cubic feet, owing to other parts of the working surface of the retorts being considerably cooler. In trying to reduce pressure upon the retorts by the exhauster, where the pipes are too small, "Country Manager" would probably draw in air at the mouthpieces open before he would get the reasonable or desirable reduction upon the pipes of the retorts last charged. If it is a mere question of overwork upon the pipes, only "Country Manager" himself can decide between new pipes or additional retorts.

Stoppage in the hydraulic main belongs to quite another chapter.

Jan. 30, 1897. J. A. F.

The Local Government Board Inquiry at Southport.

Sir,—In your issue for Jan. 19 (p. 140), in which you give a report of my examination before the Inspector at the recent inquiry at Southport, I am reported to have said, referring to Barrow-in-Furness, that "they use the jet photometer, and not the standard photometer." This requires correction. Instead of making an assertion, I asked the question: "Do they use the jet photometer or the standard photometer?" And then I went on to explain that many of the illuminating power returns were based on indications by the jet, and not by the standard photometer. Mr. Fergusson, the Manager of the gas-works at Barrow-in-Furness, writes informing me that they use the latter.

Manchester, Jan. 25, 1897. Thomas Newbigging.

The Lighting of Hyde Park.—A sum of £500 is set apart, in the estimates for 1897-8, for further improvements in lighting the footpaths of Hyde Park; and probably those who have to cross the Park after dark will come to the unanimous conclusion that the above-named sum could not be better spent.

PARLIAMENTARY INTELLIGENCE.

PRIVATE BILLS (SESSION 1897).

Memorials complaining of non-compliance with Standing Orders in the case of the remaining petitions for Private Bills (47 in number) were deposited in the Private Bill Office on the 23rd ult. One was in respect of the New Hunstanton Water and Gas Bill, the memorialists being the Hunstanton Water and Gas Companies; and the other, in reference to the Gravesend Corporation Water Bill, from the Gravesend and Milton Water-Works Company and others.

The petitions for the following Bills will go forward: Carnarvon Corporation Bill, Cowes Gas Bill, Dumfries and Maxwelltown Water Bill, Kent Water Board Bill, Llandudno Urban District Council Bill, Pwllheli Corporation Bill, St. Neots Water Bill, South Metropolitan Gas Bill, Swansea Improvements and Tramways Bill, Torquay Corporation Water Bill, the Tuxford and District Gas Bill. The Reigate Corporation Bill, the petition for which stood No. 233 in the list, will, as notified elsewhere, not be proceeded with.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Thursday, Jan. 28.

(*Before Mr. Justice* STIRLING, *sitting for Mr. Justice* KEKEWICH.)

The Incandescent Gas-Light Company, Limited, v. The New Incandescent Sunlight Company, Limited.

This motion, which was to restrain the defendant Company from publishing in advertisements or circulars any statements that the mantles of the plaintiff Company were, or might be held to be, an infringement of Rawson's patent, was heard this morning.

Mr. BOUSFIELD, Q.C., produced the agreement between the Sunlight Company and the present defendants, under which the latter have an option to purchase the Rawson patent, if its validity were established, at the price of £50,000; and, in the event of not purchasing, to pay a royalty on all the mantles manufactured by the defendants under the patent. The vendor Company also sold their business and good-will, and covenanted not to carry on any business or manufacture, except under the patent in question. Counsel argued that the effect of this agreement was to make the New Sunlight Company the sole licensees of the patent, and to have such an interest in it as entitled them to make the statements complained of. He also submitted at some length that, in the present condition of the law, a true statement of fact would not support an action for libel. It had been laid down in *White v. Mellin* that, in the case of what was called a trade libel, the plaintiff could not succeed unless he showed that the statement complained of was untrue, that it caused special damage, and that it was made maliciously. There was no suggestion here of malice, nor could there be. At all events, even if there were any question to be tried, there was no case in which, under such circumstances, an interlocutory injunction had been granted.

Mr. JENKINS having addressed the Court at some length to the same effect,

Mr. MOULTON, Q.C., in reply, urged that the agreement which had now been produced did not show that the defendants were the exclusive licensees of the patent. At the utmost, they had an option of purchase which might never be exercised, and probably never would be; and therefore they had no interest in the sub-matter which entitled them to make the statements complained of. The only object must be, not to protect their own rights, but to injure a rival trader. Even if they ultimately purchased the patent, this would not give them any right of action in respect of past infringements. With regard to the contention that there was no cause of action if the alleged libel were a true statement of fact, he pointed out that if a man said: "I have been told that A.B. is a murderer," though it might be true that he had been told so, this would not prevent the statement being actionable. The defendants carefully said "they were advised" the action would establish the validity of the Rawson patent; but this was not a statement of fact within the rule referred to.

After considerable discussion on the effect of the agreement which had been produced, his Lordship reserved judgment.

An injunction was granted by his Lordship against a defendant named Seligman, who did not appear. The evidence was exactly the same as in the previous cases in which orders had been made.

Friday, Jan. 29.

(*Before Mr. Justice* ROMER.)

In re the Incandescent Gas-Light Company's Patents.

A long list of motions by the Incandescent Gas-Light Company for injunctions against infringers came before the Court this morning. In the majority of cases the defendants did not appear.

Mr. MOULTON, Q.C., moved the first batch; and orders were made on his application against the Leader Incandescent Company, Guldman, the Behanie Incandescent Light Company, Storey, and the North London Incandescent Light Company, and others.

On mentioning a further motion against the Aurora Company,

Mr. BUCKMASTER said he appeared for the defendants, and also for the American Gas-Light Company, against whom also there was a motion; and both cases were similar. The point he raised was that in the Aurora case the writ was served in July, and the only infringement proved was in the case of three mantles purchased four months afterwards; so that there was nothing to show that there was any cause of action at the time the writ was issued.

Justice ROMER said the only result would be that a fresh action would have to be brought; and he did not see what defendants would gain by that. He thought the best way would be for defendants to give an undertaking not to infringe further, and let the motion stand over till the trial, when the question of costs could be decided.

After some discussion, these two motions stood over for a week.

Mr. TERRELL, Q.C., moved for an injunction against a Mr. Brogden for an injunction on the usual evidence.

Mr. DUNHAM appeared for the defendant, whose case was that he was only an agent for a Mr. Paget, against whom the plaintiff Company commenced an action a year ago, and had not yet brought it to trial.

There was no evidence to meet that filed by the plaintiffs as to Brogden having sold mantles which on analysis proved to be an infringement; and the injunction was therefore granted.

Other defendants against whom Mr. TERRELL moved were the Unrivalled Incandescent Lighting Company and another, the Eldorado Gas-Light Company and another, the Incandescent Meteor Mantle Company and Fielding, the International Lighting Company and another, and Pinner, none of whom appeared; and orders were made subject to the production of an affidavit of service.

Mr. TERRELL also moved against Mr. Brogden in a second action against him to restrain the issue of certain circulars, in which he gave an incorrect and misleading version of Mr. Justice Wills's judgment. It was sworn that the circular was calculated to injure the plaintiffs' business.

In this case there was no appearance for the defendant; and the injunction was granted.

Mr. WALTER then moved for, and obtained, injunctions against the Gas-Light Incandescent Company and Chaplin, the Sunbeam Light Company, and Mulley.

In another motion, against a man named Philips, the defendant appeared in person, and said he stopped the sale of the infringing mantles the night he was communicated with. He was willing to give an undertaking; and it was suggested that, to save further costs, the motion might be treated as the trial, and the matter ended. But on the defendant saying he had a mantle which was not an infringement, plaintiffs' Counsel said they would simply accept the undertaking until the trial or further order.

Mr. MOULTON, Q.C., also moved to commit Mr. Boehm for a breach of the injunction already granted against him.

Mr. BUCKMASTER appeared for the defendant; and, on his application, the motion stood over until two o'clock. When it was brought on again at that hour, he said the plaintiffs had filed nine affidavits, and the defendant had only filed one, which he could not say was a sufficient answer to the case made by the plaintiffs. But their affidavits were only filed on the previous Tuesday; and he asked for further time to meet the case.

After some discussion, it was arranged that the matter should stand over till the 9th prox., when the defendant and also the plaintiffs' witnesses should attend in Court for cross-examination.

Saturday, Jan. 30.

(*Before Mr. Justice* ROMER.)

In re the Incandescent Gas-Light Company's Patents.

Eleven cases were in the list this morning as short causes in which the Incandescent Gas-Light Company, Limited, asked for an injunction, an inquiry as to damages, and costs, for infringement of their patents.

Mr. WALTER appeared for the plaintiffs.

In the first ten cases, the order was made in default of appearance; defendants' names being Head, Belton, Hocking, F. Partridge, Kaiser, Bennett, Rochefort, Brennan, Hermann, and Gottlieb.

Mr. GATEY appeared for defendants in the eleventh case—Messrs. F. Kessell and Co.—who had entered an appearance but had not put in any defence. He said this was by inadvertence; but he was quite willing to give an undertaking and deliver up any infringing mantles. He thought he was not liable to pay costs, on the ground that the plaintiffs had sued the wrong defendants. Messrs. Kessell were fruit merchants, and had not sold any mantles at all; but Mr. F. Kessell was also a partner in another Company, called the Hygienic Company, or some similar name, and they had sold about twenty mantles. He appeared for Messrs. F. Kessell and Co., and also for the Hygienic Company.

It appeared, on inquiry, that the only partner in the firm of F. Kessell and Co. was Mr. Kessell; and as no defence had been in, and as their Counsel did not desire to put in any, the usual order was made.

(*Before Mr. Justice* STIRLING.)

The Incandescent Gas-Light Company, Limited, v. Partridge.

Mr. WALTER applied in the above action for the usual order for an injunction, &c.; no appearance having been entered by the defendant.

His LORDSHIP made the order.

COUNTY OF LONDON ASSESSMENT SESSIONS.

Sessions House, Clerkenwell, E.C.—Wednesday, Jan. 27.

(*Before Mr.* W. R. M'CONNELL, *Chairman, and a Bench of Magistrates.*)

The Assessment of the South Metropolitan Gas-Works.

This case, which was part heard at a sitting of the Court in October last,* was resumed this morning.

Sir E. CLARKE, Q.C., M.P., Mr. BALFOUR BROWNE, Q.C., and Mr. W. C. RYDE represented the Company. Mr. R. D. M. LITTLER, Q.C., C.B., Mr. MARSHALL, Q.C., and Mr. HORACE AVORY appeared for the Greenwich Union; Mr. MARSHALL, Q.C., and Mr. GRAHAM, for the parish of Battersea; Mr. MARSHALL, Q.C., Mr. SINCLAIR COX, and Mr. CUTTER, for the Woolwich Union; Mr. LAWSON WALTON, Q.C., and Mr. T. T. PAYNE, for the Lewisham Union; and Mr. GRAHAM and Mr. ELLIOTT, for the parishes of Clapham and Streatham.

* See "JOURNAL," Vol. LXVIII., p. 853.

Mr. *Arthur L. Ryde*, the first witness for the Company, whose examination-in-chief was taken at the last sitting, was now cross-examined by Mr. LITTLER. He stated that since giving his evidence, he had made a couple of reductions in his figures by taking away the item of proportional profit-sharing and a proportion of the sum under the heading of automatic meters, which would reduce the tenant's capital, according to his calculation, to £679,409, or, roundly, £675,000. He was present at the meeting of the Assessment Committee of the Greenwich Union, when the rating of the Company was considered. If the figures for 1895 had not been published then, the results were given to the Committee. The income of the Company had been growing since, but not the net income.

Mr. LITTLER: Do you know that at the present moment residuals are very much increasing in price?

Witness: No, I do not.

Would you be surprised to find that they had increased as much as 7s. 6d. on sulphate of ammonia alone?—I should be very much surprised to hear that.

Do you know whether the consumption of gas is largely increasing, owing to the Company reducing the price?—I do not think we ought to take into account the normal growth of the Company. I know that it is increasing rapidly; but that is mixed up with the normal growth of the consumers, and the new uses for gas.

I daresay you are aware that the Chairman of the Company stated in 1895, on these very accounts, that the reduction in price was the only thing they had to look to for an increase of profit?—I do not think he stated it in that way.

Witness, in further cross-examination, said that in the last quinquennium he used the 1889 accounts. The accounts for the previous year were not taken in the present instance because of the decision in The Gaslight and Coke Company's case. He had reduced his estimate of the gross receipts from the sale of gas by £28,916, in consequence of the reduction of 1d. per 1000 cubic feet. This reduction in price took place at the end of the half year he was dealing with; but he made the deduction because the receipts of the next year would be reduced by that amount. A lowering of price would stimulate the consumption; but the reduction had not created a great profit. The percentages with regard to the reductions in the price of residuals were fixed in consultation with Mr. Livesey. On being pressed to admit that he had allowed twice for the reduction in the price of residuals, witness asserted that he had merely deducted the percentage which, he believed, represented the difference in the average price of residuals in the year ending June 30, 1895, and the price in the ensuing year. If the 1d. per 1000 cubic feet were replaced, it would deprive the Company of ¼ per cent. dividend. He should say the Company were in a better position, as regarded competition, by reason of the reduction. It was quite possible that the Company received £32,400 more money, in spite of the reduction, owing to a greater number of consumers. The price of residuals was high in 1895; but it had been lower since. He had deducted the whole of the Directors' allowances from the working expenses; but this was only looking after the landlord's interest to a small extent.

Mr. LITTLER: With regard to the sick and superannuation fund, £6837, how much of this is connected with the officers of the Phœnix and other old Companies?

Witness: I am sorry I cannot answer that.

Mr. LITTLER said it was decided in The Gaslight and Coke Company's case that charges in respect of officers of other Companies which had been taken over should not be dealt with as all this sum had been.

Mr. RYDE said £475 represented all the superannuation paid to officers superseded on the amalgamation of the three Companies. The rest was for superannuation in the ordinary sense for service.

Mr. LITTLER (to witness): Are not this item and that of profit sharing insurance against strikes and other troubles?

Witness: No; they are wages in another form.

It is not to secure that there shall be no troubles with the workmen?—One of the ideas of profit-sharing, no doubt, is to attach the men to their employment.

Therefore it is a sum which is represented in the 2½ per cent. for risks. Is it not a fact that the six weeks' coal supply is an insurance against strikes in the North, and also against frost?—We are bound to have a large stock of coal.

Are you aware that a condition of getting the bonus is an agreement on the part of the workmen not to strike?—I am. It is to induce them to give longer notice.

Do you know, on Mr. Livesey's own statement, that there has not been a single difficulty or disagreement with the workmen since the profit-sharing has been introduced?—I know they have been getting on much better with the workmen than they did before.

Witness proceeded to say that his calculation for the repair of works and plant for the year came to £141,769; and for the repair and maintenance of mains and service-pipes, to £30,600. The reason he had taken only one sum, instead of the average of a number of years, was because it was an average year, and the concern was growing. If it was not an average year, the estimate was wrong.

Mr. LITTLER, to show that it was not an average year, stated that the amounts in recent years were: 1890, £91,000; 1892, £92,000; 1893, £106,000; and 1894, £134,000.

Witness (continuing) said he believed Mr. Woodall, the next witness, had got the figures by calculating on the ton of coal carbonized; and he believed Mr. Woodall's figures were very near his own. He did not know the value of the largest stock of coal the Company had ever had at any one time; but he knew they could not keep as much as they would like. He thought the usual 17½ per cent. allowance should apply to the stock a prudent tenant would hold, without reference to the actual quantity kept. He admitted that the accounts showed what money had been spent, including charges arising from the want of sufficient storage, and which involved the breaking of ice, &c. He had not treated the whole of the deposits by the customers as working capital, because they did not belong to the Company. His view was that the Company would not be safe in using more than two-thirds, as the money might be required at once. In the same way, he did not think it would be right for the Company to use the deposits of the workmen's bonuses and savings, amounting to £41,000; and, therefore, this money could not be considered in reduction of the tenant's capital. His estimate of £700,000 as the tenant's capital, might work out at 17s. in the pound on the total gross receipts.

Mr. LITTLER: I want to ask you this general question, so that you may not be taken by surprise when we come to present it: Would you doubt that if you restored that reduction of 1d. per 1000 cubic feet of gas, if you restored your discounts on residuals so as to take the actual receipts for residuals, and left the coal as it was actually, instead of deducting the £19,620 in respect of the allowance at 6d. a ton, and taking the maintenance at the average rate of a number of years, instead of the actual, that would more than support the valuation of the parish of Greenwich.

Witness: No; there are heavy alterations—one, for instance, in the tenant's capital.

Cross-examined by Mr. MARSHALL: As to the items charged first to revenue, and then to tenant's capital, so that an allowance for interest was obtained on them, he held that they certainly ought not to be charged first of all to capital, in order to justify that mode of treatment. £57,477 for repairs of works, plant, mains, &c., was his estimate of the portion of the working expenses which ought to be allowed to the tenant as tenant's capital. The description of this sum—"working expenses"—in the schedule was misleading, because it covered other items than repairs—clearing service-pipes and sweeping yards, for instance. Sweeping yards would not be charged as wages, but to repairs, if the men on the work were also engaged on repairs. Under the heading of tenant's capital, he had allowed £70,000 for stores, including tools, materials, meters, and gas-stoves in stock; but he strongly denied that he had allowed £57,000 per annum to effect repairs on £70,000 worth of property. He thought that when the hypothetical tenant took over the concern, he should have a sum of £218,000, representing five months' outlay; and he should also have £15,000 cash at bankers. He had not calculated, month by month, what the effect on a banking account would be, on the supposition that the tenant had the £218,000 on starting, and then had the sums coming in from residuals and meters from time to time. Even taking these things into consideration, he thought the £15,000 could not be dispensed with. As to the 20 per cent. for depreciation, allowed in respect of the gas meters and stoves, witness did not think the usual practice was to deduct a third of the value. He arrived at the 20 per cent. purely by rule of thumb, as it was impossible to demonstrate the exact amount of depreciation. He believed the average life of a meter was much more than 20 years.

Cross-examined by Mr. GRAHAM: Mr. Livesey claimed to deduct some £104,000 from the gross receipts for 1895, anticipating a loss in consequence of the reduction in the price of gas and residuals.

Mr. GRAHAM: During that year the receipts were increased, instead of diminished?

Witness: Yes.

Then why deduct this £104,000?—Because it is a known loss, which the tenant is aware he is going to suffer.

He did not suffer it?—The increase is made up out of the normal growth of the Company's business.

The gross receipts were £42,000 more in 1895 than in 1894?—That would result from the increased number of consumers.

By Mr. PAYNE: The original percentage of rateable value to the receipts, as regarded the Lewisham Union, stood at 7·6; but it had now risen to 9·289.

Re-examined by Mr. W. C. RYDE: The round figure which he had allowed for the life of the meters was arrived at after repeated consultations with Mr. Livesey and the Engineers. Witness always allowed 17½ per cent. as interest on tenant's capital. The tenant's capital in his valuation was not higher than it was five years ago. In 1889, it was about 78 per cent. of the gross receipts. The £675,000 which he now placed it at, was only 77 per cent., though in the £675,000 there was about £100,000 that never appeared in the valuation before. The sick and superannuation fund he treated as deferred pay; and the same applied to the profit-sharing. He had not, therefore, treated it as part of the expenses in dealing with the tenant's capital, but as a payment which the tenant would have to make, though not in the first five months. If the effect of the profit-sharing and the superannuation scheme was to attach the workmen to the Company, and make them do their work better, the result was to decrease the working expenses; and if the working expenses were diminished, the parish would have the benefit in the net results. The rates and taxes, which stood at £42,635, should be £49,562. The effect of this mistake was largely in favour of the parishes.

Mr. *Corbet Woodall*, M.Inst.C.E., examined by Mr. BALFOUR BROWNE, said that he was well acquainted with the works of the South Metropolitan Gas Company, and had prepared a valuation of their whole undertaking, based on the accounts for the year ending June 30, 1895. These figures were the latest available to a tenant proposing to take over the works in the autumn of that year. He thought it would be fair to assume that the circumstances of the Company, and the value of the material bought and sold in the then current half year, would be known to the Company. The capital employed was, he thought, exceptionally low in proportion to the business done; and as the capital was small, it followed that the amount required to pay dividends was small also—the dividends being fixed by Act of Parliament. The amount required to pay the statutory dividend of the South Metropolitan Company was 6·9d. per 1000 cubic feet; while the amount required in the case of The Gaslight and Coke Company was 10·05d., in the year 1895—a difference of over 3d. The first item in his valuation was gross receipts £870,710; which with rents of meters and stoves, made £907,128. In the year he was dealing with, a reduction in the price of gas was not only contemplated, but determined upon; and the effect of it would be a reduction of £29,180, leaving £877,948. From this he had deducted £3088 on account of bad debts; giving a remainder of £874,860. Now they had to consider the working expenses, of which the first and most important item was coal, which he placed at £426,482. It was known, however, that coal would be somewhat cheaper in future; and he had therefore allowed 6d. a ton on the amount carbonized, which equalled £19,646. Taking this from the £426,482, there was left £406,836. The residuals he had, like the other items, taken from the accounts; and they all—coke, breeze, tar,

and ammonia—totalled up to £337,300. In the latter half of the year, there were evidences of a considerable fall in the value of these products. Coke and ammonia were dropping heavily; and after consultation with the officers of the Company, he concluded it would be fair to make a deduction from the revenue, of 11 per cent. for coke and 33 per cent. for ammonia. These items together made £45,346, which left £291,954. This sum, subtracted from the £406,836, gave £114,882 as the net cost of the coal. The hypothetical tenant would then have to pay for purifying materials, wages, and repairs and maintenance; and each of these items had been taken from the accounts. The figure of £56,809 for repairs and maintenance was practically the same as Mr. Ryde gave under this head. Everything not allocated to the limited items in the accounts came under this item, which included the expense of fitters engaged in the packing and examination of the engines, the examining and overhauling of the pipes on the works, smiths who had to repair and maintain the tools, carpenters who worked on the barges and trucks, labourers in the yard, the unattached men who had to move materials about, the men engaged in fixing and examining meters, and a number of others. Altogether, he was satisfied that the one-third they had agreed to take off the total estimated average was not an extravagant provision. The Company usually received a great number of complaints at the changes of the season. He had known them to have as many as 1000 complaints to attend to in one day; and out of 85,000 customers, 17,000 changed their tenancy in one year—each case involving the attendance of one or two men. All this expense was included in the £56,809. The items were: Purifying, £21,308; works' salaries, £11,912; wages, £98,966; repairs and maintenance (one-third of total estimated average), £56,809; distribution of salaries, £20,407; repairs of meters and stoves and labour on fittings, £36,932; and public lamps, £12,315—totalling to £258,649, which, *plus* the £114,882, made £373,531. Then there were a number of items of management, &c., which, with £48,164, brought out the total expenses at £473,992; and this, taken from the gross receipts, left £400,861 as the net receipts. The tenant's capital he placed at £745,000. The expenses amounted to £716,039, which, less four-fifths of the receipts from the sales of residual products, equalled £482,476. Assuming that the tenant would need sufficient capital to carry on for five average months, he had allowed five-twelfths of this sum—namely, £201,131. Supposing the tenant went in in December, he should say five-twelfths of the average expenditure would be incurred in from three-and-a-half to four months. Proceeding with the items going to form the tenant's capital, he included a half-year's rates, £23,763; and six weeks' consumption of coal —120,000 tons, at 5s. 10d. per ton—£59,000. He maintained emphatically that six winter weeks' consumption of coal was not too much to have in stock, to meet the contingencies of fog, frost, and strikes. Then there was £224,444, value of meters as in the Company's list, less 15 per cent., or £33,666, for depreciation, which, he held, fully represented the difference in value to the incoming tenant of meters as they were, in comparison with those bought new. The automatic meters were mostly new; so that at this quinquennium the Company probably had more meters on their hands than they ever had before. The remaining figures were the cost of taps and fittings, 110,218 at 6s. 6d. each, £35,820; value of stoves, less 20 per cent., £131,722; fittings for automatic meters, at 32s. each, less 10 per cent., £46,560; stoves, tools, &c., in hand, £70,427 (£105,641 being the total, of which witness took two-thirds); and cash at bankers, £15,000. All these figures together amounted to £774,101. The reason he took two-thirds of the stoves was because some of them were landlords' stoves; but he thought this proportion would fairly represent what the tenant would have to find. There was about £26,000 in hand, in the shape of consumers' deposits; but half this amount at least must be kept ready, as it was liable to be withdrawn at very short notice. This came to £12,985, which almost cancelled the £15,000 bankers' balance; and deducting the £12,985, and sixteen weeks' receipts from the prepayment meters, at £1000 a week, they arrived at the final figure of £745,116 as the occupier's share. Taking 17½ per cent. as the tenant's interest on this sum—£130,020—from the £400,861, there remained £270,486 as the gross estimated rental. The statuteable deductions were: £113,619 for repair and renewal of works and mains, less charges for working expenses; £1400 for insurance, at 3s. 6d. on £800,000; and £5346 for renewal of gasholders—or an aggregate of £120,365. The difference between this sum and the £270,486 above mentioned—namely, £150,121—gave the rateable value of the whole undertaking, which worked out at 8·84 per cent. on the receipts.

Thursday, Jan. 28.

On the resumption of the proceedings this morning,

Mr. *Woodall* was cross-examined by Mr. LITTLER. He said that in recent years the Company had declared their maximum amount of dividend, except as regards a small sum which they were obliged to devote to certain purposes.

The CHAIRMAN: What is the maximum?

Mr. LITTLER: They are on the sliding-scale, which means this: They have a standard of 3s. 6d. per 1000 cubic feet, which is calculated at the time they get it to about cover an estimated dividend of 10 per cent. on old capital and 7 per cent. on new. Then, as an inducement to economy, the Company were told that, for every penny they reduced the price below that standard, they might divide ¼ per cent. more among their shareholders; so that it is a sort of profit-sharing between the consumer and the Company. If they exceed the standard, for every penny the price is above, they lose ¼ per cent. dividend.

Mr. BALFOUR BROWNE: The extra ¼ per cent. which we can divide means about £5000 to us; the penny reduction we make in order to divide the 5s., means £30,000 to the consumers. The standard price was 3s. 6d. per 1000 cubic feet; and the present rate is 2s. 3d.—a difference of 15d. This means that the Company are entitled to divide 3¾d. per cent. in addition to the 10 per cent. They are now dividing 13 per cent., and keeping the other ¾ per cent. to add to the reserve fund.

Witness (continuing) said that the object in reducing the price was to increase the prosperity of the Company; and the low price of gas was undoubtedly a factor in the amount consumed. Investors in gas companies regarded the price of the gas as an indication of the security of the concerns. The lower the price, the more secure the property, though every reduction tended to decrease the amount of profit at the time. It was important to consider how soon the Company recouped the immediate loss caused by the reduction. It was not quite an axiom that the Company would recoup themselves.

Mr. LITTLER: Are you aware that this reduction of a penny had nothing to do with the year which you have chosen as the account year, but came into effect the September following?

Witness: Exactly.

By the BENCH: His allowance of 6d. for the anticipated reduction in the price of coal represented about 5 per cent. on its cost. On coke, he had allowed a reduction of 11 per cent.; and on ammoniacal liquor, 33 per cent. As a matter of fact, coke had fallen to the extent of 20 per cent.

Mr. LITTLER: I see you still keep in profit-sharing £13,539, which Mr. Ryde took out. Let me point out that this profit-sharing is never arrived at until you have ascertained the dividend at the end of the half year.

Witness: I am bound to say that, looked at from the point of view of a technical surveyor, I think he is right. There is no doubt it is made up to the end of the half year. I regard it as part of the remuneration of the workmen, which would have to be paid by the tenant; and I thought it right to give it. But as it cannot be arrived at till the year is up, I do not see how it can be kept in the tenant's capital. Witness admitted, with regard to the 120,000 tons of coal to be kept in stock, for which he had allowed, that 80,000 tons was the most they had had. The Company were trying to increase their stock; and, as a practical manager of gas-works, he held that a smaller stock than six weeks'—or 120,000 tons—in winter was not sufficient to exempt the Company from risks of strike, frost, or fog. All the extra cost consequent on not keeping this large stock was, if incurred, charged to working expenses. The item of £35,820 for cost of taps and fittings, included the workmen's time in erecting the meter and collection. As to the fittings, it might be that they would be worthless if taken out—or, rather, that it would cost more than they were worth to remove them—and that therefore they did not appear in the capital account of the Company.

Mr. LITTLER: If they were not charged to capital at all, how can they come into the capital on which the hypothetical tenant can claim a share?

Witness: Surely, the incoming tenant would have to buy the material for fixing the meter as well as the meter itself. It would be perfectly fair to assume that the incoming tenant would take over the business as a going concern. In the working expenses, he had charged in respect of this item nothing more for depreciation than was sufficient to permit of it being written off in a given time. He was sure the item was not charged straightaway to revenue; and he maintained that it should be included in the allowance for tenant's capital, just as the allowance for the stock of coal was, though this item did not appear in the capital account. He denied that his treatment of the item really made it tell twice against the Company. He had allowed a deduction of 20 per cent. in respect of stoves. They wore out pretty rapidly; the average life of them being 14 or 15 years. Changes of pattern were frequent; but it did not follow that when a new pattern was introduced, the old one was thrown away. Meters were renewed from time to time in parts, so that it was not easy to say how long one would last. In the case of this Company, he should say it would be about 50 years, during which time the internal fittings would probably have been entirely renewed. The average receipts from automatic gas-meter customers for the year he was dealing with were about £970 per week; the revenue per meter being, he believed, about 12s. per annum. For gas consumed in this way, the Company received 9d. per 1000 cubic feet extra, to cover the expense of collection, fittings, &c.

Mr. LITTLER: As to the cash at bankers, which you put at £15,000, why is a man to have 17½ per cent. on money lying at his bank?

Witness: I take it as part of the money he ought to have to carry on the undertaking; and I do not discriminate between money for this portion and money for that portion of the undertaking. I take 17½ per cent. over the whole.

Why do you put it at £15,000?—That was an amount which Mr. Ryde and I agreed was about fair for so large an undertaking.

What does he want it for, when you have provided him with six weeks' extra cost of coals and five months' working expenses of every kind?—May I give an illustration? One of the banks with which the South Metropolitan Company do business, require a constant deposit of £15,000, as a condition of their taking coppers from the prepayment meters; and they have to leave this amount without interest. From the tenant's point of view, I think it is very necessary that he should have a sum of money at call for contingencies which arise from time to time, and which are partly made up by the 2½ per cent. Thus, at the beginning of 1895, when there was the great frost, the wages would enormously increase. I have only allowed the tenant half the amount of the consumers' deposits, or £12,985—though they have never been less than £26,000 at the end of any half year—because they are liable to be required at very short notice.

Are you aware that £41,000 is deposited with the Company by the workmen?—I know there is an amount so deposited.

The CHAIRMAN: Looking at the accounts of June, 1895, on the capital side you find workmen's bonuses and savings deposited with the Company, £41,200; investment of workmen's bonus, &c., £11,167. Where is the £30,000 difference?

Witness: That is in the hands of the Company, I presume. I believe a considerable proportion is invested; but to my mind it would be very dangerous to do other than keep the money ready, because the Company are liable to return it at seven days' notice; and in case of any little quarrel, the men would insist on having it back.

If it is invested in anything like Consols, they can get it at once?—If it is invested, it is not relieving the tenant's capital.

Mr. LITTLER: If out of £41,000 only £11,000 is invested, it is obvious that the other £30,000 is being held in the works, and is relieving the tenant's capital.

Witness: If it is being used in the works, it would be a relief of the tenant's capital.

And that you have taken no notice of?—No.

Cross-examined by Mr. GRAHAM: The total amount allowed for stores was £105,640; and, with the exception of a few tools that would be used outside the district on the mains, nearly all these stores were attributable to the works.

Counsel suggested that the hypothetical tenant would not at starting need all the enormous capital allowed for by witness; and to sustain this position, he put a number of questions as to the division of the net profit for the year ending June, 1895, which was placed at between £330,000 and £340,000. Witness was asked whether, if the landlord took £150,000, he (the tenant) would not put the other £190,000 in his pocket; and he replied that he was not quite clear on the point.

Mr. GRAHAM: Well, where would the money have gone; the landlord would not have got it?

Witness: It is a view that is so fresh to me, that I cannot argue it. What I do say is that, out of the profits, I am giving £130,000 to the tenant and £150,000 to the landlord.

Cross-examined by Mr. PAYNE: In the last five years, the works and property of the Company had been kept in sufficient repair to continue earning their income. He knew what was expended in the last five years on this account; but this had not influenced him much in coming to his conclusions. A sum of 5½d. per 1000 cubic feet of gas was requisite for proper repairs. During the time the new works at Greenwich were being brought into use, the wear and tear on them would be very small, increasing as they became older. It was not correct, therefore, to take a limited number of years, and say the average of those years was a fair one. He had been Engineer to the old Phœnix Company; and during many years, he spent at least 7d. per 1000 cubic feet on this score. He did not say that at the present time the Company's works were not in a proper state of repair; but they could spend a very large sum with advantage. In the bad years —1891, 1892, 1893— he believed the works were starved in this sense, and that what work could be postponed, without risk to the supply, was postponed. A part of the large expenditure on repairs in 1894-5 was rendered necessary by the Company not having spent sufficient in previous years. He would accept the statement that the average repairs for the last five years worked out at 3s. 8d. per ton of coal carbonized.

Re-examined by Mr. RYDE: The use of the automatic meters varied a good deal according to the district and customer. In the poorer parishes, it enabled the Company to reach a class of consumers whom they would not otherwise touch; and the increase under this head was very great. Very few houses, where these meters had once been placed, gave them up. With regard to the £15,000 cash at bankers, which he had charged to the hypothetical tenant's capital, this was spread over the whole thing; he did not ear-mark the 17½ per cent. on each item. Whether the tenant provided £15,000 in cash to go into the bank, or coal, or meters, it was for the moment lost. A frost caused an increased consumption of gas; but it had a way of interfering prejudicially with the business of the Company. The benefit of the larger consumption would be felt at the end of the quarter; but the increased wages and coal bills, which were also consequences of the frost, would have to be paid at once. The hypothetical tenant must be prepared to meet that expense.

Mr. RYDE: On the point as to whether the deposits of the consumers and workmen should come off the tenant's capital. Your total tenant's capital is about £745,000; and the interest on it is the profit the hypothetical tenant has, as his share of the working of the concern?

Witness: Yes.

Assuming that the deposits amounted to £745,000, if my learned friend is right in saying that the deposits from consumers and workmen should be deducted from the tenant's capital, the effect, in this case, would be to wipe out the whole of the tenant's capital?—Yes.

Then what would be left to the tenant as an inducement to carry on the concern?—Absolutely nothing.

If it is wrong to deduct them when the deposits amount to the whole, does it not seem to be wrong to deduct them when they amount to a part only?—Yes.

Mr. LITTLER: That would be quite right, for the people who found the capital would want the interest.

Witness (continuing) said it was the practice in all gas companies to keep back repairs in a bad year, in order to prevent the constant changing of the price of gas in good and bad years.

Mr. *George Livesey*, in reply to the CHAIRMAN, said the gas supplied to automatic consumers was at the rate of 9d. per 1000 cubic feet more than that supplied to ordinary consumers. Of this 9d., part was devoted to meter-rent, part to stove-rent, part to the extra cost of collecting, and the balance, whatever it might be, to the reduction of the suspense account of over £25,000 for automatic gas-fittings, which the Company did not think should be charged to capital. They had been adding about £10,000 a year to the suspense account, and paying off about £4000.

By Mr. LITTLER: He could not tell what proportion of the 9d. went to each account.

Mr. *William Marshall*, examined by Mr. RYDE, stated that he had had 30 years' experience of valuing property all over England. He had made a valuation of the Company's entire undertaking; adopting as his basis the amount of money a tenant could appropriate under his statutory powers, and not the amount in any particular year, because that might be very largely in excess of what he could touch. The total gross receipts he put at £1,244,562, and the total working expenses at £899,320; the difference (£345,242) being the profit actually earned in 1894-5. This figure was largely in excess of what could be appropriated by the Company under their statutory powers. The next figures were £277,807 appropriated for dividend in the year 1894-95, £38,062 interest on debentures, and £2118 interest on loans and deposits—a total of £317,987. The Company might have appropriated another £11,690, which they carried, however, to reserve fund. He excluded this from rating now, because the time might come when they would have to draw on the reserve fund, and then it would be rated. Adding £42,635 for rates and taxes paid in 1894-5, they had £360,622 as the profit divisible between the landlord and tenant, *plus* the rates. He estimated the working capital which the tenant would require at £730,000; and no tenant could work the business with less. The total expenses of the year amounted to £899,320; and from this he had deducted the following items: Repairs and maintenance of works, £141,769; profit-sharing, £13,539; repairs and maintenance of mains, &c., £30,661; rates and taxes, £42,635; law charges, £1206; parliamentary charges, £542; bad debts, £3088. This made a total of £233,440, and left £665,828. To this he added, for tenants' repairs of loose plant, tools, &c., £62,563, which was calculated thus: 1s. 6d. per ton on 785,844 tons of coal carbonized £58,938, *plus* average law charges (five years) £3625—making £728,443. There was the greatest difficulty in distinguishing between what were landlord's and tenant's repairs respectively; but he had been through them, and found that the tenant's share was about one-third. He struck out the parliamentary costs, because he thought they were a landlord's charge. The tenant on starting would have to provide capital for the worst part of the year—the winter quarter. A tenant assumed to enter at Michaelmas, could not work the undertaking unless he had five average months' expenses; and five-twelfths of the total expenses worked out at £303,520. Turning to the residuals, he put the average weekly income from this source at £6486. The balance-sheet showed that, on Dec. 31, 1894, there was cash due to the Company for residuals of £36,122. The items of three and a half average months' receipts for residuals from five average months' expenses (£98,380), consumers' deposits on hand at June 30, 1895, assumed to be available for working capital (£25,970), gas and meter rental collected in advance between Michaelmas and Christmas, 1894 (£13,600), and gas and meter rental collected in advance in January, 1895 (say, £4533), made a total of £142,483; and subtracting this from the £303,520, he obtained the figure of £161,037 as the cash required by a tenant to meet outgoings in October, November, and December, 1894, and January, 1895. The Company commenced collecting the Christmas quarter's rent about the middle of January; and they would therefore receive a certain amount in that month. But it would take a tenant the whole of that time to pay the quarter's rent—which he estimated at about £70,000. This was why he had ascertained what a tenant would require in the four months. He next dealt with the statutory tenant's working capital. The rates for the six months he put at £25,806; the value of the ordinary meters, at £133,548; automatic meters, at £118,781; stoves, &c., at £131,722; loose plant, utensils, stores, &c., on hand at June 30, 1895, at £148,156; and fixed balance at bankers for contingencies, at £15,000 (six stations at £2500 each). These items, with the £161,037 above, gave £734,050—or, roundly, £730,000—as the total tenant's working capital. On this sum, he had allowed the usual figure of 17½ per cent. for interest (which was the rate he took when valuing for the parish at the present quinquennium); and this produced £127,750. This, with £1298 interest paid on consumers' deposits, £6767 annual depreciation in value of new meters, and £7941 annual depreciation in value of new stoves, made a total of £143,756 as the hypothetical tenant's share of the profits of the undertaking. Taking this again from the amount divisible between landlord and tenant (*plus* rates), he arrived at the figure of £216,866. This sum was further reduced, by subtracting the difference between £176,815 for statutable deductions (4s. 6d. per ton on 785,844 tons of coal carbonized) and £172,430, debited against revenue in 1894-5—£4385—to £212,481, the rateable value of the whole undertaking, *plus* rates. The rateable value of works and dead mains, he put at £94,559; and this sum deducted from £212,481, gave £117,922 as the final figure representing the rateable value of the service mains and pipes, *plus* rates. This figure was 13·18 per cent. of the total gross receipts; and making allowance for rates, the percentage to total gross receipts was 9·98 per cent.

The cross-examination of witness was postponed.

Mr. *Livesey* was again recalled, for the purpose of making some slight corrections in his evidence, and to put in several tables relating to the business of the Company. One table showed the value of the meters at June 30, 1895, to be £224,444; of the gas-fittings, £51,732; and of the taps, £12,638—a total of £288,814. Another showed that the total value of the stoves on the same date was £116,257; the cost of fixing, at 4s. 6d. per stove, £6102; and taps for same, at 2s. 6d. each, £3390—making in all £125,749. Stoves for automatic meters, £27,062, taps, £867, and gas-fires, £10,972, brought the total to £164,651.

By Mr. LITTLER: The life of a gas-fire was very long; the article being made of cast iron. The fashion in gas-stoves was not changing much. As to the materials, it was impossible to say exactly what belonged to the landlord and what to the tenant. The reduction in the price of gas was not resolved on until the Directors knew how the half year would work out.

Mr. LITTLER: If that half year had been an unsatisfactory one, you would not have made the reduction?

Witness: We found we had a surplus; and we made the reduction to get rid of it.

That is exactly what I have been suggesting to the other witnesses; and they would not accept it?—We gave it to the consumers in that way.

Yes, because the Act of Parliament makes you?—No; we are actuated sometimes by a little higher motive.

But, as a matter of fact, the Act does compel you?—No; we could have accumulated it as an undivided surplus.

Friday, Jan. 29.

Mr. *W. Marshall*, whose examination-in-chief was taken on the previous day, was now cross-examined by Mr. LITTLER. He stated that in his calculation he had taken as the profit the amount which the tenant could appropriate under the Company's statutory powers, not the amount which might be earned.

Mr. LITTLER: As soon as they found they were likely to have an unappropriated balance, the Chairman of the Company told us that, to get rid of the surplus, they reduced the price of gas?

Witness: And the tenant would probably do the same. I cannot say that the Company agreed to a rating of 10 per cent. on the receipts when the profits were abnormally bad.

Are you aware that, in the account year of 1891, the Company actually agreed to pay, as a compromise, a greater sum by way of rates in proportion to the receipts than you bring out from your calculations on the very best year?—They agreed in many cases to 11½ per cent.; I make it about 10 per cent. Witness added that he had not calculated with the receipts as a basis, because that would be a basis on which no tenant could work, as it gave a sum in excess of what he could appropriate. His valuation of The Gaslight and Coke Company came out, he believed, at 16 per cent.; and the Court practically accepted that.

Fifteen per cent. will support this rate, in any case?—You cannot compare the two Companies; there is no analogy whatsoever between them.

The CHAIRMAN: Why not?

Witness: The Gaslight and Coke Company's Act of Parliament fixes their standard dividend at 10·63d. per 1000 cubic feet sold. In the case of the South Metropolitan Company, the Act fixes it at 7·33d. per 1000 cubic feet sold; so that really there is a difference of 3·3d. between the two.

Witness, in further cross-examination, said that in the present quinquennium, he acted for the St. George's Union, and had valued The Gaslight and Coke Company's property; but he could not remember that this valuation came out at 19 per cent. From 1889 to 1895 inclusive, the South Metropolitan Company spent some £337,000 on works, which did not include mains. In estimating the allowance for cash to meet tenant's outgoings, he had selected the months of October, November, December, and January, because the tenant must provide for the worst part of the year. He had not taken an average, as the tenant must be prepared for the maximum months' expenditure. It would not matter at what period the tenant entered, because he would still have to find capital for the maximum months.

Mr. LITTLER: If he comes in at the June quarter, he will have the whole of the profit for the quarter to provide him with capital for the next?

Witness: I should say that ought to be eliminated.

Do you say he ought to take out his profit quarter by quarter?—He must live.

Is he to charge his capital with 17½ per cent. over the whole year, when he is only needing it for three months?—I am only allowing him 17½ per cent. on the capital required to work the undertaking.

Do you mean to say, although he requires this capital for only two or three months of the year, he should be allowed 17½ per cent. on it for all the year?—Certainly; it is locked up in the undertaking, and is not available for any other purpose.

Witness, in reply to further questions, said, in regard to obtaining a temporary loan from the bankers to tide him over, he did not think the tenant could get such a loan unless he had something tangible to deposit. Under their Articles of Association, most banks would be unable to lend on the security of the accrued trader's profit. The Company had increased their meters from 61,884 in 1889 to 77,885 in 1895, which was a very large increase for so short a time. The average age of the meters added in that time, would be about three years. He had charged the depreciation fund 6¼ per cent. on this head. Therefore, assuming that nothing was spent on them, the meters would have depreciated by 45 per cent. in seven years. The Company had spent in the account year taken by witness £15,313 for repairing and renewal of meters, including labour. The value of the meters was £60,000; so it seemed that the Company had spent £15,000 in one year on £60,000 worth of meters. Witness was cross-examined at length as to the deposits of the employees of the Company, on which he had allowed the usual 17½ per cent. Counsel suggested that, as the hypothetical tenant would obtain the money at 4 per cent., witness had erred in allowing 17½ per cent. in respect of it; but witness maintained that it would not be wise for the tenant to utilize the money for his business, as he would thereby place himself at the mercy of his employees—the money being withdrawable at seven days' notice. Continuing, witness admitted that, if the Company had kept a larger stock of coal, they would not have incurred an expenditure in 1895 of £7000, the cost of breaking ice to let coal barges pass. He had allowed in the tenant's capital a sum in respect of the value of the larger quantity of coal which the Company should keep, but had not kept; and on this larger quantity, he had allowed the usual 17½ per cent.

Mr. LITTLER: If we are charged with the £7000 for the cost of not having a supply of coal, why are we to be charged for the theoretical supply of coal which you have not got?

Witness: I certainly do not think a prudent tenant could possibly do without it.

We are to be charged for both, and to be charged 17½ per cent. interest on the stock of coal which does not exist?—Well, it does not look right. Witness went on to say he had charged for the fixing of the meters because an incoming tenant would have to pay for this. In debiting the revenue with this item, he had debited it against the parish; and in respect of this he had also allowed the 17½ per cent.

If that is already charged among the working expenses, ought it, as against the parish, to be charged again?—Strictly speaking, it ought not. It was a mere trifle. Witness went on to say that if the revenue had been charged with the cost of fixing the meters, he did not think they ought to add this to tenant's capital. The proper course would be to eliminate it from the expenditure. This remark, witness further stated, applied also to fixing automatic prepayment meters and house-fittings.

Cross-examined by Mr. MARSHALL: He started his valuation with the profit in 1894-5, which was £345,242; but he abandoned this sum for £317,987, which was the total amount, under the Act, that could be divided among the shareholders. The difference amounted to £27,000. Of this sum, £11,000 was carried to reserve and £10,000 to insurance; and these items would come into the accounts for valuation in the event of their being absorbed, in time of need, by the Company. If the Company reduced the price of gas, they would be able to share the money. The result of this would no doubt be that he would make the rent of the Company dependent to a large extent upon the exercise by them of their judgment in the reduction of the price of gas. He had taken the cash required to meet tenants' outgoings as for the months of October, November, December, and January; these being the four heaviest in the year, and representing an average 5⅓ months. Assuming this to be sound, it would affect other things besides the amount representing the price of the coal, because nearly all the expenses were in proportion to the coal used. He had only allowed in the tenant's capital for 5, instead of 5⅓, months' expenses; and though the tenant would have to pay for labour on residuals, he had charged nothing for this. In his valuation, he had taken the year to June, 1895. In July, 1894, when the gross receipts were less, the stock of meters and stoves would be smaller; but the Company could not have earned the money they did in the account year without the whole of these meters and stoves. He had calculated on the basis of the maximum of the meters and stoves at the end of the year. It would not have been fairer to take the stock as in the middle of the year, because the Company could not have earned the money they did without the whole of the meters and stoves. He had taken the stores generally at about £105,000, and had deducted a quarter as the landlord's share; whereas Mr. Ryde, on the same figures, had allowed a third for the landlord's share. Witness had gone closely through the list of stores; and those he had marked as attributable to landlord totalled to £25,960. The amount he had allowed for landlord's repairs was roundly 4s. 6d. per ton of coal carbonized, which he arrived at by taking the average of the amount actually expended in the three years 1892-3, 1893-4, and 1894-5—namely, 4s.—and adding 7d. for the annual depreciation on buildings, plant, &c., constructed during the past 25 years, none of which, except one item, required renewal yet. It would not be fair to take the average of five years, because the two preceding those he had taken were strike years, and the Company only expended what was absolutely needed. He did not think that this was balanced by the abnormally good years following. The Company spent a million and a half in the last 25 years on additional works, none of which, except retorts and retort furnaces, required renewal. They were entitled to an annual sinking fund on this amount of 1½ per cent. (which gave £23,000, or 7d. per ton of coal carbonized) to provide for the renewal of the property. As to the annual depreciation in the new meters £6767, this was at the rate of 6¼ per cent. on the capital value; and the depreciation of £7941 on the new stoves was at the rate of 7½ per cent. on their capital value. The Company did not write off a certain percentage on the total cost of all their meters and stoves, but simply sufficient to maintain the stock in hand, barring the stock added, in the case of the meters in the last seven years, and in the case of the stoves in the last five years. He agreed that, applying his valuation to the landlord's capital, it equalled 7·22 per cent., and to the tenant 19·69 per cent.

By Mr. LITTLER: The rateable value of the whole undertaking, *plus* rates, he made £212,481; and the rateable value of works and dead mains, *plus* rates, £94,559. Deducting the second amount from the first, gave the sum of £117,922 as the rateable value of the mains and service-pipes, *plus* rates. Without rates, however, the figure would be practically £90,000.

Re-examined by Mr. RYDE: With reference to the percentage of rateable value to gross receipts, which witness's valuations of The Gaslight and Coke Company's undertaking, on previous occasions, had brought out, he admitted that the percentage—about 16—was higher than in the case of the South Metropolitan Company. He gave figures relating to both Companies, showing that the former could divide as dividend 3·3d. per 1000 cubic feet more than the latter Company; and they actually did do so in 1894. Assuming that 16 per cent. of the gross receipts represented the proper rateable value of The Gaslight and Coke Company's undertaking, with their powers, about 11 per cent. would represent the rateable value of the South Metropolitan Company, having regard also to their powers. As to the allowance of 17½ per cent. on the tenant's capital, and the suggestion that the hypothetical tenant could obtain a loan from his bankers, to avoid the necessity of allowing, in part at least, for this item, witness held that the Company were in the position of being both landlord and tenant, and therefore had the whole undertaking to offer as security for an advance. But the hypothetical tenant would have no adequate security, unless he was a very rich man, and had other property. The figure of £108,279, the cost of new meters added in seven years, doubtless included the automatic meters. He could not say what were the withdrawals each half year, or from time to time, of the workmen's deposits; the balance-sheet did not show it. In the accounts to June, 1894, there was deposited with the Company by the workmen £31,732, which included £7320 entered on the other side of the account, and £6000 included in the revenue for profit-sharing. Subtracting these two items left £18,412, which might, or might not, be available for working capital, and which, together with the invested part, might be withdrawn by the workmen at seven days' notice. The same method of calculation for the following quarter, brought out only £16,500 of the £41,212 deposited by the workmen, as available for capital purposes, which would also be liable to be withdrawn at seven days' notice. He had included in the tenant's capital an item for meters, and had added to it an estimate of the cost of fixing. If a hypothetical tenant were not to take these particular meters, but were to put in new ones, he would, of course, have to pay for the new meters and for the cost of fixing. The accounts did not show whether the item of fixing the meters had been charged to capital or to revenue. Strictly speaking, he thought the cost of fixing new meters should be deducted from the revenue, and not from the tenant's capital. The same applied to the coal the Company ought to store. In his opinion, the Company had acted very wisely in putting the £11,000 to reserve fund. The Durham miners had joined the Midland Federation; and he would not be surprised if there were a big strike soon, in which case there would be no coal in London. The last strike cost the Company £320,000; and where would the tenant be if he had not something to fall back upon?

Sir E. CLARKE intimated that this was the case on behalf of the appellants.

The CHAIRMAN informed the Counsel engaged that the Court were not disposed to depart from the 17½ per cent. allowance for tenant's interest, in its general application. He added, however, that this would not refer to matters which Counsel might say should not be included in tenant's capital.

The remainder of the report will appear next week.

BROMLEY (KENT) PETTY SESSIONS.—Monday, Jan. 25.

(*Before Mr.* COLES-CHILD, *Chairman, and a Bench of Magistrates.*)

The Crystal Palace District Gas Company Fined for Deficient Illuminating Power.

To-day the Crystal Palace District Gas Company appeared in answer to a summons, taken out by the Beckenham Urban District Council, for supplying gas of less than the standard illuminating power required by their Act of 1893.

Mr. F. STEVENS, the Clerk to the District Council, prosecuted; Mr. G. A. SCOTT, barrister, appeared for the Company.

Mr. STEVENS, in opening the case, said the delinquency occurred on the 11th of January, when the Gas Examiner of the Council (Dr. S. Rideal) found the gas at the Beckenham station was of 14·06 instead of 15 candle power.

Dr. *Rideal* was called, and stated that on the day named he gave the Company notice by telegram that he was going to test the gas; and the Company were represented on the occasion by Mr. R. A. Gandon, their tester. The gas was of only 14·06-candle power.

In cross-examination by Mr. SCOTT, witness described the method by which he conducted the test; admitting that he did not reverse the disc after making five of the ten statutory observations for arriving at the average illuminating power. He said he had tested the gas at Beckenham for three years, and always in the same manner—never reversing the disc, so far as he could remember.

Mr. SCOTT: Is it a practice recognized by the Gas Referees to reverse the disc?

Witness: It is necessary under the Referees' Instructions.

Mr. STEVENS objected to this line of cross-examination.

The CHAIRMAN said the Bench did not see how the Gas Referees' Instructions could apply to Beckenham.

Mr. SCOTT said he desired to show that the practice had become so essential to obtaining accuracy, that it was specified by the Referees. (To witness): Do you now say, having regard to your answer that you did not reverse the disc, that it is not the universal practice to so reverse it?

Witness: It is not the universal practice. According to the Gas Referees, it is absolutely necessary.

The disc is a very delicate part of the photometer; and if one side is defective or injured, would it not affect the testing?—Not on my test.

Do you say that, supposing the right side of the disc was injured or had any defect, and that side was kept next the gas all through the test, the test would be an accurate one?—It would be a test under the Company's Act.

But would it be an accurate test?—No. I do not believe much in gas testing myself, though I should like the Gas Referees' Instructions to apply to Beckenham.

And so, as you were not bound, under the Company's Act, to reverse the disc, you did not do so?—I carried out the Company's Act.

If Mr. Sugg tested the gas with the same disc, and reversed it as directed by the Gas Referees, on the 21st of January, and found a result of 17·45 candles, what would you say?—I do not know what happened on the 21st of January.

If the disc gave 14·06-candle power on one side, and 16·10-candle power on the other, would not the average be 15·12 candles?—I did not test it in that way.

Is it not fair to say that the reason why the illuminating power of the gas was reported by you to be less than the Act required was because the disc was defective? Is not that amply sufficient to account for it?—Yes.

For two years you had tested with the disc in one position, and therefore you did not think it necessary to reverse it on this occasion?—If there had been any sort of doubt about it, I would have done so.

By the CHAIRMAN: His certificate was a correct one under the Company's Act, but not under the Gas Referees' Instructions.

Dr. *Otto Hehner*, late President of the Society of Analysts, was then called and examined by Mr. SCOTT. He said that on the 21st of January, in company with Mr. W. Sugg, he made a series of observations at the Beckenham gas-testing station. The results were as follows: (1) The disc of the photometer was not changed, and the gas was shown to be 17·45-candle power. (2) The disc was reversed, and then the gas was 15·32 candles—a deficiency of 2·13 candles.

Mr. SCOTT: What would have been the result of reversing the disc on the day on which Dr. Rideal's test was made?

Witness: The gas would have been 15·13 candles.

The disc was an unequal one?—It must have been, though it was impossible to tell by looking at it. But these inequalities happen continually. Discs may be injured by being carried too close to the flames, by temperature, and by other slight causes.

Mr. *W. Sugg* corroborated the previous witness's evidence, and emphasized the fact that the discs of photometers were very liable to injury and inequality.

Mr. *R. A. Gandon*, the Company's gas tester, said the disc used on the 21st of January for the tests made by Dr. Hehner and Mr. Sugg was the same as that employed by Dr. Rideal. Witness had himself used it between the 11th and the 21st, reversing it to obtain accurate results.

Mr. STEVENS contended that, if there was any defect in the apparatus, the Company, who were bound by their Act to keep it in repair, were responsible for the results.

Mr. SCOTT argued that, on a true test, the Company had supplied gas of the statutory quality, and were not to be held responsible for the results obtained by an antiquated method of testing.

The CHAIRMAN said the Bench were of opinion that there ought to be a conviction. The Company would consequently be fined £5, with £5 5s. costs.

Mr. SCOTT asked the Chairman to state a case as to the grounds of the finding. He asked if the Magistrates were of opinion that the illuminating power of the gas was under 15 candles.

The CHAIRMAN: Yes.

Mr. SCOTT: And the grounds of that finding?

Col. COLVILL (a Magistrate): The Gas Examiner's certificate.

CHESTER COUNTY COURT.—Wednesday, Jan. 27.

(*Before His Honour Judge Sir* HORATIO LLOYD.)

A Question as to the Preferential Claim of a Gas Company Against a Debtor's Estate.

The Mold Gas and Water Company to-day sued Thomas Lewis, of Mold, and Arthur F. Dodd, an accountant, of Liverpool, the Trustees of the estate of Peter Maddocks, who was formerly owner and occupier of the Black Lion Hotel, Mold, for a sum of £37 17s. 8d., which was said to be owing to the Company by Mr. Maddocks prior to his failure.

Mr. S. MOSS appeared for plaintiffs; Mr. COLLINGWOOD HOPE for Mr. Lewis; and Mr. BROADBRIDGE for Mr. Dodd.

Mr. Moss, in opening the case, said that, on the failure of Mr. Maddocks, a deed of assignment was executed, under which the defendants were appointed Trustees. A composition of 10s. in the pound was offered and accepted; and the Trustees continued to carry on the business. Mr. J. M'Gregor, the Secretary of the Company, attended the meeting of creditors, and pointed out that, as the debt of £75 odd due from Mr. Maddocks was a preferential claim, it must be paid in full. In proof of this, he mentioned that the Company had the right to take summary proceedings for the recovery of the arrears, and also to cut off the supplies of gas and water. Mr. Lewis promised that, if this were the case, the debt would be paid in full, and in this statement his co-Trustee, as well as the Committee of Management, acquiesced. Afterwards Mr. M'Gregor received a cheque from the Trustees for £37 17s. 8d., which was stated in an accompanying letter to be the first dividend of 10s. in the pound under the estate of Mr. Maddocks. On the same day Mr. M'Gregor met Mr. Lewis, and told him that he did not mean to sign the receipt, because he claimed that the Company were entitled to payment in full. Mr. Lewis remarked to him not to sign it, but to take the money as payment on account.

After witnesses had been called for the Company and the Trustees,

Mr. HOPE contended that, if any promise had been made, it was a purely conditional one; the condition being that what Mr. M'Gregor had said as to the Company having a preferential claim was correct. As a matter of fact, the Company had no preferential claim. They had a right to take summary proceedings for the recovery of a debt in default of payment, and also to cut off the gas and water supplies. But this did not constitute a preferential claim; and Mr. M'Gregor's representation that it did was an absolute travesty of the Company's Act.

Mr. BROADBRIDGE, on behalf of his client, also argued that there was no preferential claim, urging that the Company's power to distrain did not mean that they had a preferential claim in the sense of having priority in bankruptcy.

His HONOUR reserved judgment.

The East London Water Company's Rating Appeal.

On Monday last week, a sitting of the Court of Quarter Sessions for the County of London was held—Mr. Loveland-Loveland presiding—for the hearing of appeals from assessments under the last quinquennial valuation of the Metropolis. Mr. G. Barnes, in the case of the East London Water Company's appeal against the Assessment Committee of the Hackney Union, said the Court had devoted several days to the hearing, subject to the decision of the Queen's Bench Division of the High Court of Justice. The higher Court discharged the rule *nisi* on the previous Monday (see *ante*, p. 189); and he was now instructed to abandon the appeal, and accept the assessment. Mr. W. C. Ryde asked for costs. After some discussion between Counsel, the Chairman formally dismissed the appeal, with costs against the appellants.

Conviction for Stealing Gas.

At the Harlesden Police Court, last Thursday, Thomas George Brooks, of 2, York Terrace, Chamberlayne Wood Road, Willesden, was charged on a summons with feloniously stealing on Jan. 15 and divers other dates, 200,000 cubic feet of gas, of the value of £28 6s. 8d., the property of The Gaslight and Coke Company. Mr. R. H. Humphreys prosecuted, and said it was a serious case with regard to the public and the workmen of the Company. Defendant, on account of the position he held in the Company's service, would know just when the collector would call, and would be able to remove the surreptitious pipe by means of which he had cheated his employers. The evidence of two of the Company's inspectors showed that Brooks had been employed in the Kilburn district office of the Company for three years; and for the past twelve months, his duty was to show gas-stoves in the show-room. He was in receipt of a salary of £2 5s. a week, and was a consumer of the Company's gas at his house, where he had one of their stoves on hire. Though he lighted his house with gas, and the cooking for his family was done by means of the stove, it was found that his bill in two years only amounted to £3 18s. 4d. One of the inspectors asked him how he managed it; and he said he had to be economical, on account of having a large family. After some quibbling, he said he had a "temporary connection" which prevented the gas passing through the meter. He was immediately discharged, and went with two of the Company's men to his house. On the way, he wanted to be allowed to go on and remove the "temporary connection," so that the men could report that they found nothing wrong. At the house, examination showed that defendant had two gas and asbestos fires besides the cooking-stove. He had disconnected the meter from the service-pipe, and obtained his supply of gas by the usual piece of india-rubber tube. A calculation had been made, which showed that, at the very smallest computation, defendant must have stolen 200,000 cubic feet of gas, the value of which was £28 6s. 8d. Defendant pleaded "Guilty," but said he thought the quantity of gas he had stolen had been exaggerated. The Bench told defendant he had been systematically robbing the Company, and in his position as a servant he must have known he was committing a serious offence. On account of his family, the sentence would be lighter than they might have inflicted; but he must go to prison for four months with hard labour.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Report and Accounts.

The following report, with the accounts showing the working of the Company during the six months ending Dec. 31 last (given on the opposite page), will be submitted to the proprietors at the half-yearly general meeting next Friday:—

The accounts for the past half year show that, after providing for all fixed charges, there remains a balance of £417,934 os. 3d., out of which the Directors recommend a dividend at the statutory rate of 12¾ per cent. per annum, carrying forward to the credit of the current half year the sum of £45,747 15s. 1d.

There has been again a most satisfactory increase in the sale of gas during the past half year; the total quantity sold being 10,263 million cubic feet, or 809 millions (equal to 8½ per cent.) more than in the December half year, 1895. The quantity of gas sold in the year 1896 was the largest on record—20,116 million cubic feet; and exceeded the quantity sold in 1894 by 1874 millions. This shows an average annual rate of increase for the two years of 5 per cent., which compares with an average annual rate of increase for the period 1884 to 1894 of 1·85 per cent.

The marked improvement in the demand for gas is explained partly by the extraordinary increase in the number of gas-stoves in the Company's district during the past two years, and partly by the introduction of the automatic meter system within the same period.

The gross cost of manufacture for the half year has been very satisfactory, but the low prices of some of the residual products have again adversely affected the Company's income. The net cost of gas is therefore slightly higher than in the December half year, 1895.

The charges for distribution continue to show a material increase when compared with past years, but this is satisfactorily accounted for by the addition of 59,000 consumers within the past two years, and by the exceptional expenses incurred in connection with the introduction of the system of automatic meter supplies.

The Directors have to report that the result of the offer for sale, by tender, of £150,000 ordinary "A" stock, in August last, was the placing of the whole amount at an average price of £308 16s. per cent.

The Engineers attached to the several departments have respectively sent in their certificates to the effect that the whole of the Company's plant has been fully maintained during the past half year.

Following the report is the statement of accounts. As usual, we merely indicate the alterations that have taken place in those portions which are not subject to much variation, giving the rest in full.

Nos. 1 and 2 are the statements of stock, share, and loan capital, the totals of which on Dec. 31 last were as follows: Stock and share capital, £9,004,000; loan capital, £2,444,000. The former amount is £150,000 more than it was on June 30; this amount of "A" stock having, as mentioned in the report, been issued in the interval. The total amount of the existing share capital powers is £9,204,000, and of borrowing powers £2,669,000; so that there is a sum of £200,000 unissued share capital, and £225,000 remains to be raised on loan.

No. 3 is the capital account, the receipts on which (with premiums, £1,476,950) stand at £12,924 950. The expenditure is shown in the following items:—

Expenditure to June 30, 1896			£11,910,721 3 7
Expenditure during the half year to Dec. 31, 1896, viz.:—			
Lands acquired, including law charges	£493 0 7		
Buildings and machinery in extension of works	17,473 5 2		
New and additional mains and service-pipes	25,591 1 8		
Do. do. meters	44,780 9 1		
Do. do. stoves	29,033 6 6		
		117,371 3 0	
		£12,028,092 6 7	
Balance of capital account		896,857 13 5	
		£12,924,950 0 0	

Nos. 4 and 5 are the revenue and net revenue accounts. These are given in full.

No. 6 is a statement showing how the Directors propose to appropriate the balance applicable for dividend. It is as follows:—

Dec., 1895.			
£256,801 ..	Net balance brought from last account	£108,897 14 11	
267,230 ..	Net revenue for the half year	309,036 5 4	
£524,031		£417,934 0 3	
(12¾ per cent.)	A dividend on the ordinary stock —		
£359,970 ..	12¾ per cent. per annum on £5,896,590	372,186 5 2	
£164,121 ..	Balance carried to next account	£45,747 15 1	

Nos. 7, 8, and 9 are the reserve and insurance fund and depreciation accounts. The first shows that the balance on June 30 last was £130,683, which was increased to £132,357 on Dec. 31 by the addition of £1674, interest on the sum invested. The insurance fund stood at £86,226 on June 30, the interest on which came to £1105—together £87,331. But in the half year payments on account of the claims arising out of the explosion of gas in New Church Court, Strand, on Oct. 29, 1895, were made to the amount of £6983; and the value of the plant destroyed by fires is put at £65—together, £7048. The balance on Dec. 31 was consequently brought down to £80,283. The depreciation fund amounted to £45,262 on June 30, and to £46,441 on Dec. 31.; the difference consisting of £500 brought from the revenue account, and £679 interest on the amount invested.

Nos. 10 and 11 are as follows, and Nos. 12 and 13 are given on the opposite page.

No. 10.—STATEMENT OF COALS USED, ETC.

Description of Coal.	In Store, 30th June, 1896.	Received during Half Year.	Carbonized during Half Year.	Used during Half Year.	In Store, 31st Dec., 1896.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common . .	143,734	1,102,931	1,010,118	1,951	234,596
Cannel . .	12,869	26,684	*15,663	—	23,890
Total . .	156,603	1,129,615	*1,025,781	1,951	258,486

* In addition to this quantity, oil and spirit, the equivalent of 33,544 tons of cannel, have been used during the half year.

No. 11.—STATEMENT OF RESIDUAL PRODUCTS.

Description.	In Store, 30th June, 1896.	Made during Half Year.	Used during Half Year.	Sold during Half Year.	In Store 31st Dec., 1896.
Coke—tons	201,456	634,773	133,354	548,150	154,725
Breeze—tons.	1,773	68,345	28,599	37,336	4,183
Tar—gallons	642,223	10,651,327	10,464,905	20,432	808,213
Ammoniacal liquor—butts	17,648	269,733	257,339	11,062	18,980

EXTENSIONS AT THE BIRMINGHAM CORPORATION GAS-WORKS.

Proposed Duplication of the Water-Gas Plant.

During the month of December, the output of gas at the Birmingham Corporation Gas-Works represented an increase of 30½ per cent. on the previously recorded maximum daily, and of 18½ per cent. on that of the maximum weekly, output. This very great increase requires the early provision of both storage and manufacturing plant. The storage capacity at the three works is about 26½ million cubic feet; while the maximum daily output in December exceeded 33 million cubic feet. It will be obvious, therefore, that additional storage is immediately needed; and this provision will have to be made at the Saltley works, where the production is now greatly in excess of the storage accommodation. The productive capacity of the three stations (including the recently-constructed carburetted water-gas plant), working to their fullest extent, is about 167 million cubic feet weekly; while the output in the week ended Dec. 24 was 156½ million cubic feet. The margin of 10½ million cubic feet is insufficient for purposes of safety for next season's supply alone. It would not be possible (the Gas Committee say, in a report from which the above particulars have been taken) to make any extensions of the coal-gas plant which could be brought into operation by next winter; and it is therefore imperative that further provision should be at once made by an addition to the carburetted water-gas plant. Owing to the short time this plant has been in operation, the Committee have not had sufficient experience to enable them to report definitely on the exact cost of manufacture. But it has been ascertained that, as regards productive capacity and convenience of handling, expectations have been fulfilled; and they have no reason to doubt that the working has been satisfactory in other respects. In the buildings erected for the plant, provision was made for the duplication of the whole of the generating plant; and the Committee recommend that they be authorized to expend a sum, estimated at £43,000, in the duplication of the plant. In this way, a total additional weekly production of 26 million cubic feet will be provided. But, having regard to the desirableness of having always one set of the generators in reserve at each of the works, the additional output that can be safely counted upon is only 13 million cubic feet, increasing the present margin between the maximum weekly output already attained and the productive capacity of the three works from 6¾ to 15 per cent. It will also be necessary to take early steps to increase the coal-gas plant. It is mentioned that authority has been given by the Committee to expend £2800 on the alteration of retorts at the Windsor Street works. A recommendation will be made that the salary of Dr. Colman, chemist at the Saltley works, should be increased from £300 to £350 per annum as from the 1st ult.

Londonderry Water Scheme.—After many reports and much discussion and inquiry, the Londonderry Corporation decided some time since to obtain an additional supply of water from the Killea springs and stream, from which it is estimated that 400,000 gallons daily can be derived in the driest weather. The cost of the scheme cannot, it is said, exceed £20,000; and with the present service (making together about 6 million gallons weekly) would be sufficient for a population of 50,020, or about 16,000 more than the present population. Power to carry out the works was obtained in the last session of Parliament; and it is proposed to get them completed within two years.

New Joint-Stock Companies.—The Improved Sanitary and Lead-Lined Pipe Company, Limited, has been registered with a capital of £60,000, divided into 8000 ordinary shares of £5 each and 2000 cumulative preference 6 per cent. shares of £10 each, to acquire the patent rights and inventions of D. G. Brighton and E. M. Venning in relation to the manufacture of lead-lined iron pipes, lead bends, &c., as now carried on by them, and to develop and extend the business. The Frost-Proof Water-Pipe Syndicate, Limited, with a capital of £10,000, in £5 shares, is to acquire any patents, patent rights, inventions, &c., relating to improvements in the manufacture of frost-proof pipes; and to develop and turn them to account. The Cannock, Hednesford, and District Gas Company, Limited, has been registered with a capital of £40,000, in £1 shares, to acquire and take over the business, property, and assets of the Cannock and District Gaslight Company, Limited, and of the Hednesford Gas Company, Limited, and to supply gas at Cannock, Hednesford, Gentleshaw, Longdon, Norton Canes, Great Wyrley, Cheslyn Hay, and elsewhere in Staffordshire.

ACCOUNTS OF THE GASLIGHT AND COKE COMPANY FOR THE HALF YEAR ENDING DEC. 31, 1896.

No. 4.—REVENUE ACCOUNT.

Dr. Cr.

Dec. Half Year, 1895.	To Manufacture of gas—	£ s. d	£ s. d	Dec. Half Year, 1895.	By Sale of gas—	£ s. d.	£ s. d.
	Coals, including oil, dues, carriage, unloading and trimming (see Account No. 10)	579,268 17 10		£1,250,973	Common gas, per meter, at 2s. 10d. and 2s. 3d. per 1000 cubic feet	1,364,325 11 3	
£535,206	Salaries of Engineers and other Officers at works	13,448 2 8		76,700	Public lighting and under contracts— Common gas (See Statement No. 12.)	77,156 19 6	1,441,482 10 9
13,014	Wages (carbonizing) £164,038/13/11			£1,327,673			
156,259	Sundries . . £16,287/4/10	180,325 18 9					
16,082	Purification, including £16,275/3/2 for labour	31,502 4 3		£10,753	Rental of stoves	..	12,416 1 2
33,327	Repair and maintenance of works and plant, materials and labour, less received for old materials, £2154 5s. 1d.	157,011 19 1		£228,438	Residual products— Coke, less £45,539 17s. 10d. for labour, &c.	201,905 2 11	
				3,594	Breeze, less £1919 12s. 8d. for ditto	3,528 6 5	
118,553				70,831	Tar and tar products	70,957 12 2	
			951,557 2 7	53,098	Ammoniacal liquor and sulphate of ammonia	44,256 14 1	
	Distribution of gas—			£355,961			320,647 15 7
	Salaries and wages of Officers (including Rental Clerks)	28,877 17 10					
27,018	Repair and maintenance of mains and service-pipes	44,755 2 10		£4,091	Rents receivable		4,013 19 0
55,822	Repair and renewals of meters	24,794 1 7		222	Transfer fees		229 0 0
25,189	Stove fixing, repairs, and renewals	25,160 18 7					
32,643			123,587 15 10				
	Public lamps—						
17,194	Lighting and repairing	..	17,539 0 8				
	Rents, rates, and taxes—						
4,433	Rents payable	4,839 3 5					
101,760	Rates and taxes	111,830 18 11					
			116,670 2 4				
	Management—						
2,750	Directors' allowance	2,750 0 0					
200	Company's Auditors	200 0 0					
8,841	Salaries of Secretary, Accountant, and Clerks	8,948 14 6					
15,544	Collectors' commission	17,895 16 9					
5,467	Stationery and printing	6,638 17 9					
2,454	General charges	2,551 6 9					
			38,984 15 9				
—	Parliamentary charges	..	20 12 2				
1,939	Law charges	..	2,055 1 2				
6,484	Bad debts	..	5,037 7 0				
	Depreciation fund for works on leasehold lands	..	500 0 0				
—	Annuities	..	13,413 3 8				
12,035							
	Public Officers—						
884	Gas Referees and Official Auditor	1,215 4 1					
870	Public testing-stations	792 7 2					
			2,007 11 3				
£1,243,298			1,281,372 12 5				
455,402	Balance carried to net revenue account, No. 5		497,416 14 1				
£1,698,700			1,778,789 6 6	£1,698,700			1,778,789 6 6

No. 5.—NET REVENUE ACCOUNT.

Dr. Cr.

Dec. Half Year, 1895.		£ s. d	£ s. d	Dec. Half Year, 1895.		£ s. d.	£ s. d.
	To Interest on debenture stocks and bonds, accrued to Dec. 31, 1896	..	62,659 12 6	£616,771	By Balance from last account	474,710 16 3	
74,015	Dividend on the preference stocks	74,015 5 0		359,970	Less dividend on the ordinary capital for the half year to June 30, 1896.	365,813 1 4	
47,500	Dividend on the maximum stocks	47,500 0 0					108,897 14 11
			121,515 5 0	£256,801			
3,937	Interest on temporary loans and sundry funds		4,205 11 3	455,492	Revenue account (No. 4)	..	497,416 14 1
524,091	Balance applicable to dividend on the ordinary stock		417,934 0 3				
£712,203			606,314 9 0	£712,203			606,314 9 0

No. 12.—STATEMENT OF GAS MADE, SOLD, Etc.

Description of Gas.	Quantity Made.	Quantity Sold.			Quantity used on Works, &c.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights and under Contracts (estimated).	Private Lights (per Meter).	Total Quantity Sold.				
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	*10,943,772	540,424	9,722,610	10,263,034	149,904	10,412,938	530,834	52,154
Dec. half year, 1895	10,134,319	536,756	8,917,133	9,453,889	136,996	9,590,885	543,434	51,922

* Including 789,543,000 cubic feet of "oil gas."

No. 13.—GENERAL BALANCE-SHEET.

Dr. Cr.

Dec. Half Year 1895.		£ s. d	£ s. d.	Dec. Half Year 1895.		£ s. d.	£ s. d.
£	To Capital—			£			
376,359	Balance at credit thereof	..	896,857 13 5	125,818	By Cash at Bankers	..	84,790 13 5
	Net Revenue—				Amount invested—		
524,691	Balance at credit thereof	..	417,934 0 3		2¾ per Ct. Consolidated Stock . . £229,693 19 3	..	211,129 17 11
211,130							
	Reserve Fund—				Stores on hand, viz.—		
129,010	Balance at credit thereof	132,357 7 7			Coals	145,163 18 6	
	Insurance Fund—			157,072	Coke	57,875 1 1	
85,180	Balance at credit thereof	80,283 9 6		55,902	Tar and ammoniacal liquor and products	251,786 19 4	
214,190			212,640 17 1	264,013	Sundry stores	241,112 3 3	
				206,273			695,938 2 2
	Depreciation Fund—				Accounts due to the Company, viz.—		
44,593	Balance at credit thereof	..	46,441 0 0		Gas and stove rental—		
	Interest on debenture stocks and bonds,				Quarter ending Dec. 31, 1896	954,888 0 8	
62,659	due on Dec. 31, 1896	..	62,659 12 6	897,592	Arrears outstanding	11,598 10 7	
	Preference and maximum dividends			12,502			976,486 11 3
121,515	due on Dec. 31, 1896	..	121,515 5 0				
	Unclaimed dividends due on Dec. 31,			31,934	Coke and other residual products	45 132 18 2	
8,004	1896	..	8,003 18 9	2,794	Sundry accounts	3,376 5 6	
	Sundry tradesmen and others, for						48,499 3 8
	amount due for coals, stores, and			154,988	Automatic meter supplies (fittings		
343,685	sundries	..	365,336 3 6		account)	..	216,211 8 9
1,667	Benevolent Fund	..	1,667 6 8				
350,000	Temporary loan	..	100,000 0 0				
66,914	Additional capital account	..	..				
2,119,118			2,233,055 17 2	2,119,118			2,233,055 17 2

THE AGITATION AGAINST WATER GAS IN LIVERPOOL.

The excitement in Liverpool over the supply of water gas by the Gas Company does not seem to be abating; and it has spread across the Mersey to Birkenhead. Much correspondence has appeared in the local Press on the subject, under such alarming headings as "The Dangers of Water Gas" and "The Effects of the Birkenhead Mixture." In one letter, attention has been called to the statement of Mr. C. Petrie, in the course of his speech at the recent meeting of the Liverpool City Council, that "he was informed there was no more danger from water gas than from coal or cannel gas." This was published in the "JOURNAL" last week; and it is only fair to Mr. Petrie to say that the important qualifying clause was omitted "where there is no escape of gas." In the letter pointing this out, Mr. Petrie says that the Corporation Lighting Committee (of which he is Chairman) has been for the last twelve months actively engaged in dealing with this and other questions relative to the general gas supply; and so long ago as May, 1896, recommendations on the subject, based upon the best expert advice, were forwarded to the Company. Large bodies, he says, are slow to move; but he believes he is right in stating that "the Directors of the Company are now contemplating the introduction of changes which will give satisfaction as regards the Garston gas to all concerned." A few days after the publication of this letter, it was announced that, at a meeting of the Directors on Wednesday, the subject of the carburetted water gas manufactured at Garston was fully considered; and it was decided to make arrangements for the immediate mixture of that gas with ordinary cannel gas. This, it was hoped, would remove all the objections which have been raised against the Garston gas as hitherto supplied to the consumers in that district.

Report by Mr. T. O. Paterson on the Objections to Water Gas.

Mr. T. O. Paterson, M.Inst.C.E., the Gas Engineer of the Birkenhead Corporation, has addressed to his Committee a report on the use of carburetted water gas; and his general conclusions are that, if properly used, there is no danger in its employment. The report reads—

After a conference with the Chairman of the Committee (Mr. Alderman Bloor), I have prepared, and beg now to submit for your information, certain facts and figures in reference to the introduction and use of carburetted water gas in various cities and towns in England and America.

Birkenhead and Liverpool being in a sense one town, it is not surprising to find that the editors of certain newspapers have devoted their energies to working up a water gas scare on the Cheshire side of the river, in keeping with their action on the Lancashire side. If there is anything required to emphasize the saying that "History repeats itself," it is to be found in the Liverpool Press of to-day, as they are now covering the same ground and using the same arguments promulgated by the American Press of some twelve to fifteen years ago. The people of America have, however, long ago accepted the new gas; and the bitter arguments of the technical and daily Press, written against it at the fighting period, are now only interesting and historical documents.

It is of interest to briefly state how matters stood in the early days of carburetted water gas in the United States. About the period mentioned, carburetted water gas was made practical, and brought under the notice of the gas companies of the chief cities of the United States; and it is a well-known fact that both directors and officials of the coal gas companies rejected the offers then made to them, with the result that works were established for the manufacture and supply of carburetted water gas in competition with coal gas—a condition of things which would not, perhaps, be sanctioned in England. The fight of Carburetted Water Gas *v.* Coal Gas was of long duration, and waged with intense bitterness. Every possible means were used by the Press to choke the spread of the new gas; and like means were adopted on the other side to induce an expansion of trade. Bills were drawn up and submitted to the various legislative assemblies (in one State made law, but afterwards repealed), prohibiting its sale. With reference to the repeal of the law in this State, a petition signed by 223 Boston physicians, in their joint capacity as gas consumers and physiological experts, concluded with the statement: "It is no more dangerous to health and life than coal gas; and there is no just ground, as far as health and life are concerned, to prohibit its manufacture." Through all this trouble water gas surely and steadily forged ahead, and secured such a strong position that coal gas companies found it not only necessary, but advantageous, to adopt the system; and it is something to relate that nearly 75 per cent. of the gas now made in the United States is carburetted water gas, and the absorption is still going on. [Mr. Paterson then quotes the following eminent chemists and scientists to show the non-injurious effects of the gas: Professor Henry Wurtz, New Jersey, U.S.A.; Dr. Gideon E. Moore, New York; Dr. H. Croft, Toronto; Dr. W. H. Pike, Toronto; Dr. Edward Frankland, Royal College of Chemistry, South Kensington; Dr. Crum Brown, Edinburgh; and Professor A. Wurtz, Paris.]

The following is an analysis of carburetted water gas: Unpurified—Sulphuretted hydrogen, 0·6 per cent.; carbonic acid, 2·8; unsaturated hydrocarbons, 10·3; oxygen, 0·1; saturated hydrocarbons, 22·3; carbonic oxide, 27·1; hydrogen, 29·4; nitrogen by difference, 7·4. Analysis of purified gas—Carbonic acid, 0·0 per cent.; oxygen, 0·0; olefines, &c., 13·9; marsh gas, &c., 26·2; carbonic oxide, 22·7; hydrogen, 32·8; nitrogen, 4·4. The chemical analysis of carburetted water gas varies from time to time, according to the method of running the apparatus, and the quantity and qualities of the raw material used.

The usual objectionable ingredient to most people in carburetted water gas is the percentage of carbonic oxide. They usually think to themselves that this gas, pure in the laboratory, will produce certain effects on animal life by deoxidizing the blood, &c., overlooking the fact that the small percentage of this gas found in illuminating gas is entirely different when mixed with some eight or nine other gases, and forming only a part of a homogeneous whole, from what it is in its pure state. One of our ablest scientists has recently made a series of experiments on the effects of different gases upon the system, and has arrived at the conclusion that, where death ensues from illuminating gases, it is from suffocation—that is, simply and entirely from the want of oxygen, and not, as was originally supposed, from any poisonous effect of the gases. In other words, that death ensues before any chemical action has taken place within the system.

It may be well to note that coal gas contains from 3 to about 11 per cent. of carbonic oxide. In Birkenhead, the coal gas contains about 6 per cent.; so that a mixture of 50 per cent. of coal gas and carburetted water gas will have in it from 15 to 16 per cent. of carbonic oxide gas. But as it is not at present proposed to issue the mixture in Birkenhead in these proportions, the percentage of carbonic oxide in Birkenhead gas will be usually from 11 to 13 per cent. It will thus be seen that the mixture now supplied is not appreciably more deleterious than the coal gas distributed in some towns in England.

It is very difficult to distinguish the presence of carburetted water gas in a mixture of carburetted water gas and coal gas until the mixture contains over half of its amount in carburetted water gas, either for heating or other purposes. Anything under 50 per cent. is hardly recognizable; the relative chemical compositions of coal gas and carburetted water gas being nearly the same.

The value of carburetted water gas as a heating agent compared with coal gas of like illuminating power is about 5 per cent. less than coal gas—that is, when burning separately, owing to the coal gas containing a greater percentage of marsh gas than is contained in carburetted water gas, this ingredient giving a greater amount of heat when burning. When using the mixture, there will, however, be practically no difference to the consumer for cooking, heating, or power.

Carburetted water gas has another important advantage, as it contains scarcely one-tenth of the sulphur present in coal gas.

During the past twelve days, 21,830,000 cubic feet of coal gas have been made and 6,358,000 cubic feet of carburetted water gas, or at the rate of 77·45 per cent. of coal gas to 22·55 per cent. of carburetted water gas.

I have received information from twelve towns in England now partly supplied with carburetted water gas, and find that the average supply of this gas is equal to 31·2 per cent. of the whole supply. Several of these towns are working up to as much as 50 per cent. of carburetted water gas; and in one case the whole supply for a week was given. In some towns, consumers were at first against the use of this gas. But their objections eventually disappeared; and in no instance have the rancorous remarks been made that lately have appeared in this district. It may be added that in nine other towns in England, the gas authorities are preparing to supplement their gas-making plant with installations of carburetted water gas, and to supply a proportion of the gas together with the coal gas.

From the foregoing facts and figures, the Committee will no doubt be assured that, if the mixture of coal gas and carburetted water gas now supplied to the gas consumers in this town is distributed and consumed with the same care and attention to pipes and fittings as has been given in the past, when coal gas only was supplied, there can be no reasonable or valid objection to the supply and use of a mixture of carburetted water gas and coal gas, which is equally suitable and effective for all domestic and trade purposes as coal gas alone.

Criticisms of Mr. Paterson's Report.

Surgeon Lieutenant-Colonel T. Cayzer, A.M.R., in a courteously worded letter, says that Mr. Paterson has fallen into errors in his report when dealing with physiological facts. Having recognized Mr. Paterson's authority to speak "as far as gas manufacture and distribution goes," he proceeds to comment upon the two consecutive clauses in the report commencing "The usual objectionable ingredient" and ending at "taken place within the system." This portion of the letter is as follows: "Mr. Paterson says: 'They usually think to themselves that this gas, pure in the laboratory, will produce certain effects on animal life by oxidizing the blood,' &c. The gas of which he speaks is the carbonic monoxide, as he says in the immediately preceding line, 'The usual objectionable ingredient in carburetted water gas' is 'carbonic oxide.' Now, this statement of his (the all-important statement) is directly contrary to the facts. The carbon monoxide is a fatal poison by preventing the oxidizing of the blood. Fatal error No. 1. And his next sentence confirms what I say entirely, as he himself quotes an opinion to this effect—viz., that where death does ensue, it is simply and entirely from want of oxygen; and Mr. Paterson's statement, noted above, is denied by his own witness. A gas which causes want of oxygen (which is a prime necessity for life) is a poisonous gas by its power of causing that want, and carbon monoxide is highly poisonous by that power. Mr. Paterson also says that 'death ensues before any chemical action has taken place in the system.' Fatal error No. 2. Death does not and cannot ensue until the hæmoglobin has entered largely into union with the poisonous carbon monoxide, and has been converted into a different matter, called from the union carboxy-hæmoglobin, which is readily distinguished from the life-giving oxy-hæmoglobin—the product of inspired fresh air. If the spectra of oxy-hæmoglobin and carboxy-hæmoglobin are examined after a reducing agent, such as ammonium sulphide or Stokes's fluid, has been used, the difference cannot escape notice."

In connection with Mr. Paterson's report, another correspondent asserts that the heating value of the gas supplied in Birkenhead has depreciated considerably since the admixture of water gas. He says: "The Gas Engineer of Birkenhead states that water gas has been supplied for the past sixteen days; and ten or twelve days ago, it was reported to me that a bunsen burner in our gas-range did not boil water in the usual time. This, in perhaps a rough-and-ready way, I found to be correct, and resolved to test the heating power with greater precision than can be obtained on an open gas-range in open vessels. For this purpose, the bunsen burner always used in my laboratory to heat an autoclave to 400° Fahr. was turned full on; and, with the same quantity of fluids in the vessel, it took thirty-five minutes longer time than usual to obtain the same temperature. Besides this, the perforations of an English-made circular bunsen used almost daily

during this time have clogged up so much that nothing like the former heat can be obtained."

Scientific and Medical Reports.

In the notice which appeared in last week's issue of the proceedings at the meeting of the Garston District Council in connection with this question, reference was made to reports which had been presented to that authority on the scientific and medical aspects of the supply of water gas in the locality. In view of the wide interest attaching to this question at the present time, we publish these documents *in extenso*. The authors were Mr. Holbrook Gaskell, jun., J.P., and Surgeon Lieutenant-Colonel Cayzer.

Mr. Gaskell's report was as follows:—

So far as history is concerned, you know as much about it as I do. For the past two years, you have seen the illuminating power and quality of the gas different from what it used to be, and probably we have all had the difficulty that I have experienced with the burners covered with hard carbon. When the gas-works here were first erected, I had no idea that they were preparing to make water gas, or I should have taken the matter up at that time. It was only after I found that the illuminating quality of the gas was inferior that I made inquiries, and found that they were supplying water gas. Water gas is composed of hydrogen and carbonic oxide in something like equal proportion. That gas has little or no illuminating power, and is enriched by petroleum. The illuminating power is the result of the petroleum. Hydrogen, practically speaking, is harmless. Carbonic oxide is the most deadly, insidious poison known to chemistry. I have a letter from my cousin, Dr. W. H. Gaskell, of Cambridge (one of the most eminent physiologists of the day), in reply to a request I made for his opinion. The letter is dated Jan. 10, and is as follows:—

I found your letter last night. The best thing I can do, I think, is to send you Haldane's paper. He has been working for some time on carbonic oxide poisoning, and is the chief authority on the subject at the present time. The main points are that carbonic oxide combines with great power with hæmoglobin, so that it is difficult, or impossible, to replace it quickly with oxygen to make oxy-hæmoglobin. A very small amount of carbonic oxide in the air breathed is capable of producing a distinct effect with mice. Haldane found 0·05 per cent. of carbonic oxide in the air breathed caused very distinct torpor and loss of power of limbs; while 0·221 per cent. carbonic oxide in the atmosphere killed in 2 hrs. 22 mins. With men the poisoning effect is very insidious, so that a feeling of torpor and loss of power comes on without warning; and then it is too late to escape. In breathing the air, ordinarily the oxygen, used in the tissues, is carried by the red blood corpuscles in the form of oxy-hæmoglobin; the amount of oxygen dissolved in the blood fluid is insufficient to preserve life. Consequently when the carbonic oxide has replaced the oxygen to a large extent in the hæmoglobin, death must occur through an insufficient oxygen supply. If, however, the animal be made to breathe pure oxygen at a pressure of two atmospheres—30 lbs. pressure—sufficient oxygen is taken up by the fluid of the blood to keep the animal alive, even although carbonic oxide is breathed as well, so that all the hæmoglobin of the blood corpuscles is converted into carbonic oxide hæmoglobin. In these circumstances, the mouse appears perfectly well, and not affected in any way by the carbonic oxide. Remove it from the oxygen atmosphere to ordinary air, and immediately it is dead, because all its oxygen-carrying power is gone. From this and other experiments, we see that the carbonic oxide poisoning is entirely confined to the deprivation of oxygen. It is like breathing nitrogen, or an indifferent gas—it has no symptoms of its own. For this reason, and because of its power of combination with hæmoglobin when only very small quantities are present, and because it gives no warning, it is a most dangerous gas; and I cannot conceive a more reckless or abominable thing than to supply a gas to houses containing a large quantity of this gas. Its presence in the blood can easily be detected by the cherry colour of the carbonic oxide hæmoglobin blood, and its characteristic spectrum.

That is a letter from one of the leading physiologists, which shows you what dangerous gas this is; so that you may be breathing it in very minute quantities, acting all the time on the red corpuscles of the blood until the blood can no longer support life. You have no warning of this until you have lost all power of locomotion. You cannot escape from it; and you must stop there until somebody happens to find you. That generally is the effect; and that is the gas which the Gas Company are now supplying to us without any warning, and without any precautions to see that the gas-fittings are safely tight. In America, where they have taken this idea from, the gas companies are not allowed to connect the water gas with houses until the gas-fittings have been examined and certified correct. A high pressure is put in the pipe of mercury power. Here it has been made without any examination at all; and we know what the result has been. In France, they look upon the coal gas as so dangerous that they are not allowed to connect coal gas to the houses until the fittings have been certified to the police. . . . Coal gas contains carbonic oxide in minute proportions—3 to 8 per cent.; water gas is made up to 50 per cent. That is the position; and I do not think the Gas Company, or any gas company, have the right to supply that gas. I do not think they are within their powers to do it. I do not know what their orders were; but I think the intention, when they got the monopoly, was that they should supply coal gas. If it is to be supplied, I think it should only be supplied under very stringent conditions of inspection, under the sanitary authority. I do not think it would be satisfactory to the public to think that the authority of the Company would be sufficient. Inspection would be expensive to adopt; but I do not think it should come upon the rates—it should be borne by the Company. In Switzerland, the Government, when this matter was under consideration, appointed a Committee of Inspection to go into the matter; and they said in their report that it would only be right to allow the use of this gas—that was for commercial purposes, not for domestic purposes—on three conditions: First, that a leak-detector is provided, which shows, during the daytime, when they are not burning gas, any gas that is passing, so that a man who is attentive can tell by watching the instrument whether his pipes are reasonably tight. Second, that the gas should be mixed with something that would give a strong odour, so that if there was a leakage it could be found by the smell. Thirdly, that over every gas-burner there should be a hood to take to the outside air any fumes that might pass, or any incompletely burned gas. There is as much danger from the gas if there is any portion in the atmosphere unburned as if the carbonic oxide had been turned out. [Mr. Gaskell proceeded to suggest that Dr. Hurter should be requested to apply to the Gas Company for permission to examine their water-gas plant, and to make an analysis of the gas. He referred to the use of water gas for heating purposes, asserting, on the authority of Dr. Hurter, that it blocked up the pipes of cooking-stoves with a carbonaceous deposit. The heating power of water gas he put at one-half that of coal gas.]

Surgeon Lieutenant-Colonel Cayzer's report was as follows:—

The question of the gas supply in our district has seemed to me important enough to justify me in strengthening the force of my own opinion and that of the usually quoted authorities, by an appeal to a member of my profession who has devoted much of his time to the study of poisons. I do not propose to enter at all upon the questions of illuminating power, nor speak about the deleterious solids present in rooms where the gas which we are now using is the sole or principal means of lighting; but the statements I am making are such as come within my own province. My course of study during the past year had led me to the consideration of the prominent points before I had any idea that I should be called on to pronounce any personal opinion. I have myself seen one fatal case of carbon monoxide poisoning in the township in the latter part of last year; and I have been informed that another fatal case occurred. In addition, there was another case of dangerous poisoning by carbon monoxide at the Travellers' Rest Hotel in Aigburth Vale, another at the Garston Hotel, and another at one of the police stations. I wish to speak about the far larger number of instances which may occur without the poisonous effects of carbon monoxide being pushed to the extreme borderland of danger. I must quote very largely the words of the higher authority of whom I spoke just now. He is Professor J. Dixon Mann, professor of toxicology at Owen College, Manchester, and examiner on forensic medicine in the University of London. He has been kind enough to enter into correspondence with me; and I am quite sure your Committee will feel indebted to him. For all practical purposes, coal gas owes its poisonous properties to the presence of carbon monoxide exclusively; consequently the greater the percentage of carbon monoxide, the more dangerous to life is the gas. In coal gas the percentage of carbon monoxide varies from about 5 to 8 per cent. Water gas contains from 40 to 50 per cent. of carbon monoxide; and so, when used as an adjunct to coal gas, the percentage of carbon monoxide in the mixed gases is increased in proportion. The poisonous percentage of carbon monoxide in respired air begins at about 0·1 per cent.; and 0·3 or 0·4 per cent. are dangerous to human beings. One per cent. is sufficient to cause death. Professor Mann suggests to me that I should make it clear to your Committee that the poisonous effect of carbon monoxide increases according to the length of time during which the gas is inhaled; so that a very *feeble dilution becomes dangerous if it is respired for consecutive hours*, as, for instance, in a closed room at night during sleep. Each lungful breathed in transfers a certain quantity of the gas to the blood, which stores it up, as the blood has a special affinity for this highly poisonous gas, and shows a strong disinclination to part with the gas when it has been absorbed. If the breathing of the gas goes on long enough, the blood gradually becomes charged to a fatal degree. When the blood is half saturated, original symptoms are produced apart from fatal poisoning. The presence of minute quantities of carbon monoxide in the air (as from pipe leakages, &c.) produces various symptoms due to chronic poisoning, such as debility, anæmia, difficulty of breathing, and other ailments. I will not now enumerate beyond saying that many aches and pains often set down to rheumatism may be induced, as the general health is undergoing deterioration by the chronic slow poisoning. This poisoning from minute quantities of carbon monoxide in the air is materially favoured by the use of water gas, as it is almost without odour; and consequently, although mixed with coal gas, the odour may pass unobserved. Yet the percentage of carbon monoxide may be dangerous. When coal gas only contains an intrinsic percentage of carbon monoxide, the odour is a safeguard. The figures I give are derived from analyses made by several chemists; and information on the subject may be found in Thorpe's "Dictionary of Applied Chemistry." Lastly, there is no antidote known to poisoning by carbon monoxide; it is one of the most fearful poisons in existence.

A PUBLIC LIGHTING QUESTION AT CLITHEROE.

A Time Basis of Charge.

A very good case was made out by Mr. Cowgill, at the last meeting of the Clitheroe Town Council, for the reduction of the charge for gas for public lighting. A resolution was recently passed that "the price of gas be reduced 6d. per 1000 cubic feet for all purposes, the reduction to come into effect at the close of the present financial year." When this resolution was under consideration, the question was asked of the mover whether it would apply to the gas supplied for street lighting, as the Lighting Committee were the largest consumers; and the reply was that it would not, as the street lighting was paid for on a different basis. This basis is a certain price per 100 hours; and it has been the custom to charge by this method since 1879—the year following the transfer of the works to the Corporation, previous to which the average meter system was in use. Mr. Cowgill now sought to have the charge reduced to 2s. 3d. per 100 hours, as an equivalent to the reduction of 6d. per 1000 cubic feet. In the course of his argument in support of the proposal, he said that the working statement of the Gas Department practically showed that the Lighting Committee were charged on a basis of so much per 1000 cubic feet, as it provided for the supply of 3,011,200 feet to the Lighting Committee; and this worked out to 3s. 5¾d. per 1000 feet. They were asked that the best customer the Corporation had should be called upon to pay 6d. per 1000 feet more than the value which the Corporation themselves placed upon the commodity. How could this be justified? They were, he contended, simply making capital out of the ratepayers in order to produce a balance-sheet which would show a profit. The old Gas Company charged private consumers at the rate of 5s. per 1000 cubic feet, less 4d. discount; and at that time, the members of the Lighting Committee entered into an agreement with the Company for the supply of

gas at the rate of 4s. 3d. per 1000 cubic feet. Shortly after the Corporation acquired the property, there was a reduction; and the then Gas Manager submitted the scheme for charging the Lighting Committee at so much per 100 hours. This was accepted by the Committee, and had remained in force ever since. Was there any sense in charging 2s. 6d. per 100 hours to the ratepayers, when, had the Lighting Committee participated in the general reduction, they ought only to be paying 1s. 8d. now? At the same time, he did not think it redounded to the credit of the Gas Committee at that time that they accepted from their Manager a recommendation which was not on the lines of their dealings with private individuals. It was natural that they should try to make the concern a paying one; and it was the Manager's study, in order to justify the purchase. He was not, and would not be, a party to taking in an indirect way from one department in order to assist another. They had reduced the price to 3s.; but they had the audacity practically and in effect to say that, as nearly one-half the people were non-consumers, they would keep up the price to the Lighting Committee, in order to make them contribute in an indirect way. If they could afford to give special advantages to the consumer of 800,000 cubic feet, surely they ought to do so to the consumer of 3,011,000 feet. The Mayor (Mr. Garnett) seconded the motion; but it was lost—it being generally thought that the matter should be left over until the close of the present financial year. Mr. Cowgill has also given notice of a motion to rescind a resolution granting manufacturers the privilege of being charged for gas at their houses at the same rate as at their works.

SALES OF STOCKS AND SHARES.

Last Tuesday, Mr. Alfred Richards conducted an important sale of gas and water stock and shares at the Mart, Tokenhouse Yard, E.C. The first parcel consisted of 10 fully-paid original (£10) shares in the Lea Bridge District Gas Company, carrying a dividend of 10 per cent., but entitled, under the sliding-scale, to 3 per cent. more if earned; and they were sold at £26 10s. per share. The next lots comprised some new ordinary shares in the same Company, ranking for a standard dividend of 7 per cent., but, with the present price of gas, entitled to 10 per cent., if earned. These shares were knocked down at £16 10s. each. Some fully-paid original (£30) shares in the Great Yarmouth Gas Company, carrying a dividend of 8¼ per cent. per annum, were next sold at £64 each; some 7½ per cent. shares, of the same nominal value, fetching £56 each. The next lots consisted of consolidated stock of the Brentford Gas Company, the last dividend on which was at the rate of 12 per cent. per annum, but entitled to 12½ per cent. if earned; and the greater portion was sold at the rate of £296 per cent. Some new stock, last dividend 9 per cent. per annum, but entitled to ½ per cent. more, if earned, was knocked down at £220 per cent. Some lots of "A" stock of the Barnet District Gas and Water Company, earning 9 per cent. per annum, were sold at the rate of £243 to £250 per £100 of stock. Ordinary consolidated stock of the Hornsey Gas Company, last dividend 8 per cent. per annum, but entitled to ¾ per cent. more, if earned, was disposed of at £190 per cent. The final parcel consisted of some ordinary consolidated "A" stock of the Tottenham and Edmonton Gas Company, last dividend 11½ per cent. per annum, but entitled to 12 per cent. if earned, which was sold at £295 per cent. In all cases, the purchasers took the dividends accruing from the 1st of July last; it being, on the original shares in the Yarmouth Gas Company £1 5s. 6d., and on the ordinary shares £1 2s. 6d. per share.

Among recent sales of shares, we note the following: Some original £5 shares in the Littlehampton Gas Company, earning 10 per cent., fetched £12 7s. each *cum div.* from June 30; a second parcel selling at 2s. per share more, and a third at £12 10s. per share. Some ordinary £5 shares (7 per cent.) in the same Company fetched £8 9s. each. A parcel of £12 10s. shares in the Abingdon Gas Company has lately changed hands at £13 5s. per share. A number of £10 shares in the Tilehurst, Pangbourne, and District Water Company sold at £9 10s. each. A parcel of £140 of No. 1 stock in the Reading Gas Company realized £262; £72 of No. 2 stock, £90; £10 preference shares, £13 each; and £10 ordinary shares, £16 10s. each—this price being the highest yet paid for ordinary shares of the Company. At Morley, £67 10s. of stock in the Morley Gas Company realized £173; while £321 was paid for £180 of 7 per cent. consolidated stock, and £42 15s. for £32 8s. of 5 per cent., original stock. At Plymouth, 40 new £10 shares in the Plymouth and Stonehouse Gas Company were sold for £21 per share.

AN AMERICAN'S IMPRESSIONS OF STREET LIGHTING IN LONDON AND PARIS.

One of the Commissioners of Public Works of New York—General C. H. T. Collis—recently made a hurried trip to Europe, in the course of which he inspected closely some of the public works of London and Paris. On his return, he was induced by the Editor of the "Sun" to give an account of his impressions of what he had seen; and in the course thereof, he makes the following remarks on the street lighting of the above-named cities:—

Dealing first with Paris—that being the city dear to the hearts of all Americans—General Collis says: "The illumination of Paris, both by gas and electricity, is in charge of private corporations. One Company supplies all the gas consumed in Paris for all purposes, while there are at least half-a-dozen electric companies having monopoly charters for certain districts. The gas-mains are all laid in the sewers, and the electric light conductors are laid under the sidewalk. The price of gas is about $2·04 per 1000 cubic feet. As a result, small hotels still supply their guests with candles; and charge them in the bill. Larger hotels use electricity; but I saw none using gas. For municipal purposes, however, the price is a little over $1. The lamplighters are appointed by the city authorities, but paid by the Gas Company; and each evening before starting out they may be seen in groups receiving their instructions from their foremen—these instructions being dependent upon the condition of the atmosphere, the moon, and the treasury. All domestic gas-pipes are located on the outside of the walls of houses, and not inside and out of sight as with us. Strangers who are accustomed to confine their view of Paris to the grand avenues and boulevards, and the passages with their brilliant little shops, carry home with them the impression that the French Metropolis is the best-lighted city in the world; but this is far from being the fact. Those streets which are continually upon dress parade are superbly lighted, it is true; but the streets in the densely-populated parts of the City, inhabited by the poorer classes, are as dingy as any streets I have ever seen. In some of them there is only just sufficient light to escape total darkness. Whether this is due to the fact that the Gas Company get only half rates for street lighting, or to Government economy, I do not know; but I am sure that similar streets in New York are better lighted. The Champs Elysées is naturally the most brilliantly illuminated of all. Americans who drive at night from the Madeleine or the Rue de Rivoli, across the Place de la Concord, up the Champs Elysées to the Arc de Triomphe, find a carriageway splendidly illuminated by gas-lamps at short intervals, using Welsbach twin burners similar to those now in use on our own boulevard, picturesquely supplemented with a never-ending stream of cabs, with their yellow-burning oil-lamps, that make a pleasing contrast with the white of the gas; while thousands of cyclists dart here and there behind their little lights of all variety of colour. But let the visitor take himself to Montmartre or the fringe of the Quartier Latin, and he will find the butcher or the greengrocer selling his provisions with the aid of a naphtha lamp or flambeau put up and maintained at his own expense. In the poorer districts, the lamp-posts are at long intervals; but they are equipped with 5 and 6 feet burners, while in New York ours have been only 3-feet burners, since gas was introduced seventy years ago. I may say here, in parentheses, that it looks to me as though the Welsbach gas-burner would become the approved method of Parisian illumination."

Coming to London, Colonel Collis records his impressions of its street lighting as follows: "The lighting of London, like the supply of water, is in the hands of private corporations, much to the regret of the authorities. The cost to the City is about 56c. per 1000 cubic feet for gas. The cost of electric light I did not ascertain; but as there is very little of it, it was not material. Some parts of London are well illuminated; but this is owing more to the lamps than the power of the gas or the number of lamp-posts. The designs of the lamps are not only ornamental, but they get more light out of the same amount of gas than any others I have seen. Perhaps the handsomest are those on Northumberland Avenue, near Trafalgar Square, which consist of a group of three globes set in bronze cups and capped with coronets; the whole surmounting a very ornate post about 20 feet high. But the ordinary street-lamp found in the chief streets of the Metropolis is also most attractive. It is about the size and shape of a lady's parasol, the interior of the roof being white glazed, and the glass kept beautifully clean. The effect of long rows of these lamps placed at short intervals is brilliant. Nevertheless, no street lighting in Paris or London excels the Edison lamps on Fifth and Madison Avenues for beauty or illumination. In localities remote from the hotels and private residences, where the humbler classes dwell, the lighting is not so good as in similar localities in New York, though the fogs of London render the best illuminating essential."

ELECTRIC LIGHTING NOTES.

According to what transpired at a recent meeting of the Kingston Town Council, more money is required for carrying on the electric lighting undertaking of the Corporation. This has not been a particularly flourishing concern hitherto; but it seems now to have turned the corner. The minutes presented by the Lighting Committee of the Corporation on the occasion referred to contained a statement submitted by the Consulting Engineer (Mr. A. H. Preece), showing the expenditure and liabilities in respect of works executed on capital account, which reach a total of £29,497. Of this sum, the loans at present authorized and received amount to £23,772; leaving an actual indebtedness of £5725. The Borough Electrical Engineer (Mr. J. E. Edgcome) submitted an approximate estimate for the enlargement of buildings and plant at the central station and the extension of mains, to the amount of £14,242. The Committee resolved that, having regard to these two statements, the Council be recommended, through the General Purposes and Finance Committee, to authorize application to be made to the Local Government Board for sanction to the borrowing of a further sum of £20,000 for electric lighting purposes. It was further resolved that Mr. Edgcome be the Consulting Engineer in regard to the carrying out of the proposed extensions. The minutes of the General Purposes and Finance Committee showed that they had considered and approved of the proposed loan. Mr. Collings, in moving the adoption of the recommendation, said the Council had spent more money than they had applied for; and, in order to liquidate the debt already incurred, they must apply to the Local Government Board for permission to borrow £5725. Then it was clear that they could not go on receiving fresh applications for the supply of the electric light unless they provided sufficient machinery to generate it; and as the lamps already fixed left them with no spare power, if the large machine was at any time to break down they would find themselves without sufficient plant to carry on the lighting of the lamps already installed. This was a state of affairs that anyone who understood machinery would know could not be indefinitely continued. He acknowledged that the excess of demand was not very much greater than their powers of supply; but he said it was large enough to render their position not a very safe one to continue. Then they had to look to the wants of the customers who were coming on. Having a monopoly, the Corporation could not refuse to supply electricity when it was asked for by any ratepayer within the prescribed area. They must put themselves in a position to comply with the Order under which they obtained the power to start the monopoly. Having given

particulars of the proposed expenditure, he referred to the financial position of the undertaking. He remarked that, at the meeting of the Council last October, he estimated at £111 the probable excess of receipts over expenditure for 1896 on works account; but it would be seen from the annual report of the Engineer that it came to £301. The expenditure had been £106 within the estimate; and the receipts were £84 more. They had now overcome the greatest difficulty that attended the initiation of a high-tension system, and had arrived at the position when they would get the advantage of their comparatively low capital expenditure. He believed that in two years' time they would own an undertaking which would have justified the confidence of the Council and the ratepayers in the Lighting Committee, and would be a source of revenue to the Corporation. It was perfectly clear to the Committee that, unless they obtained and spent the money they required, such a result could never be arrived at. The only logical alternative to going on with the scheme was to sell the undertaking, which he had no doubt they could do at a very good price. But he thought past experience of the existing private monopolies—the Gas and Water Companies—was not such as to lead them to desire the introduction of a third. Mr. W. H. Nuthall seconded the motion. Mr. Horsfield expressed regret at being the only dissentient upon the Committee. But he confessed that he could not understand the figures put forward. The profit of £301 was, he said, altogether illusory, as nothing had been allowed for depreciation, which in the case of machinery of this kind should have been done. Again, the £301 was only obtained at the cost of a sum of £1627, the repayment of capital and interest, besides which they were in debt to the tune of £5725. He thought the Chairman's outlook was too roseate. Most of the principal shops were already supplied with the electric light; and he did not think it was possible for the business to develop at anything like the same rate as hitherto, unless they were going to light private houses. But he did not think there was much likelihood of this. He advocated the lighting of the streets by electricity, which, he said, they could do for less than they now paid for gas. He concluded by moving, as an amendment—"That no scheme for the extension of the electric light be placed before the Local Government Board, or be considered satisfactory, which does not provide, in addition to private lighting, for some tried and approved method of lighting the streets, wherever the high or low tension main is or may be laid, with a power of electricity equal to that furnished by incandescent gas." Mr. Judd seconded the amendment. Mr. Glover thought the original Committee must have been very incompetent if they could not foresee that these enormous sums would be asked for. If they were not incompetent, they were very artful; for it was a case of the spider and the fly, and the Corporation were now drawn nicely into the web. He should like to see the whole thing well sold for the benefit of the town. The Corporation already paid for about half the current supplied. If they went on in the present style they would have no ratepayers left in the town in another ten years. Mr. Collings, in reply, remarked that Mr. Horsfield evidently thought the Committee were very much too modest in their demands. The only reasons why they did not come forward with a scheme for street lighting were that it would involve a considerable amount of extra capital outlay; and just at the present moment they were not quite decided as to which was the best method of street lighting. When they put the low-tension mains in, as was provided for in the estimate, the Committee would be able to light all the street-lamps where the mains were laid. As to the depreciation not being allowed for, the Local Government Board never required it when, as in the case of the Corporation, they were paying off 1-25th of the capital every year. As to private lighting, they were prepared to take the light wherever there was a demand for it. The amendment was then put and lost; and the application for the proposed loan was sanctioned with four dissentients.

The Hanley Town Council have resolved to apply to the Local Government Board for further borrowing powers to the amount of £15,000. Of this, £10,000 is required for a new engine and other apparatus at the central station, £4000 for extension of mains, and £1000 for house wiring on the hire system. When the proposed application was before the Council, Mr. Hammersley explained that, in the first year of the working of the undertaking, they asked the Local Government Board to sanction the borrowing of about £24,000. This was found to be insufficient; and they sought a further sum, which made the total £46,110. Out of this, the Committee expended on capital account generally—in the laying of mains, and so on—the sum of £42,145. As to the progress of the concern, he said that in 1895 they sold 180,469 units at 6d. per unit; and last year, 247,881 units at 5d. per unit. The revenue last year was £4192; while the meter-rental was £106, or half as much again as in 1895. The number of lamps fixed was 17,954. The profit before setting aside depreciation in 1895 was £1443, and last year it was £1789.

The St. Pancras Vestry has identified itself with the motor-car industry in a curious way. Last Wednesday week, the Electric Lighting Committee reported that they had received inquiries respecting the price at which the Vestry would undertake the charging of accumulators for motor vehicles. In view of the probable extensive demand for current for this purpose, the Committee consider that every facility should be granted to encourage this class of consumer, as the charging would be carried out during the hours the central stations were running on a light load, and would therefore considerably augment the earning capacity of the plant and consequent profit to the Vestry. After fully considering the matter, they recommended—"That, subject to special regulations as to the hours of charging, the price for charging accumulators for motor vehicles at either of the Vestry's central stations be 2d. per Board of Trade unit." Mr. Cox, the Chairman of the Committee, said he thought that eventually there would be a large demand for current in respect of motor vehicles. The charge quoted (2d. per unit) had been considered a fair price by their Engineer; and, as the current supplied could be generated at times of the day when the plant would otherwise be idle, and as the Company whose application was under consideration would be a large consumer, he thought the Vestry would be wise in adopting the recommendation. Mr. Lazarus opposed this. He said he was of opinion that it was unbusinesslike, as the Vestry would be undertaking the supply of current on unremunerative terms. He moved, as an amendment, that the price be altered from 2d. to 3d. per unit. Mr. Kenneth M'Crae, in seconding the amendment, said the ordinary day rate was 3d. per unit; and he was quite opposed to any lower one being charged. Dr. Wigg remarked that, as the expense of electric lighting was heavy, such an income would be a relief to the parish. Mr. Menzies (one of the Committee), in regard to the apparent reduction in price, said that 25 per cent. of the current was wasted in sending it through the cables. After further discussion, the amendment was lost, and the report of the Committee adopted as it stood.

The General Purposes Committee of the Carlisle Corporation have resolved to proceed, with all convenient speed, with the installation of the electric light in the city, in order that it may be inaugurated some time next autumn.

In laying before the members of the Halifax Town Council on Wednesday last a proposal that a tender should be accepted for the supply, at the electric lighting works, of a new engine and dynamo for £3610, Alderman Woodhead announced that there had been an increase of about 45 per cent. in the output in 1896, compared with 1895. But even this substantial advance did not enrapture some of the members. On the contrary, Mr. Hebden, in opposing the recommendation, made one or two damping remarks—to the effect that there was not by any means perfect satisfaction in regard to the electric light; that he did not think there was likely to be a very rapid increase, except they could seriously reduce the cost to consumers; and that, though the works were capable of supplying 17,000 lights, the demand at present was only equal to 6500 lights. Mr. Greenwood inquired if there was any prospect of the works paying, as, if not, he would not be in favour of the spending of the money as proposed. Alderman Spencer reminded the Council that the Corporation were bound to supply the electric light. They could not take a monopoly like that, and then play with it. Mr. White considered it would be very unwise to oppose the Committee; and the resolution was passed.

The financial statement of the Hull Electric Lighting Committee for the past year shows a net profit of £1970, against £1263 for 1895.

At the meeting of the Court of Common Council last Thursday, Mr. Turner, the Chairman of the Commissioners of Sewers, in reply to Mr. Hitchings, said the City of London Electric Lighting Company had been granted the exclusive privilege of opening streets in the City to supply the electric light for a period of 21 years, which period, however, would not commence until after the Commissioners had decided as to the mode of lighting the side streets.

What is there about the electric light that it so frequently obscures and confounds the judgment of local governing bodies? Some of them have certainly very confused notions of what electric lighting costs, and especially of the "profits" which electric lighting undertakings are likely to yield. It is not often, however, that even district councilmen have an opportunity of looking to electric lighting as a means of relieving the financial difficulties of a gas undertaking. This, however, is the position in which matters at present stand at Teignmouth. Having distinguished themselves by carrying on the gas-works at an absolute loss, and getting the concern into a general muddle, financial and otherwise, the District Council of that pleasant town now propose to see what they can do with the electric light. The question came up, at a meeting held last Tuesday, on a recommendation of the Highways Committee that the matter should be considered in connection with the proposed outlay in improving the gas-works, "seeing that the present cost of gas for the public service is nearly equal to 4 per cent. upon £22,000." Mr. G. Denney, who moved the adoption of this recommendation, said that at present the Council paid about £900 a year for gas; and if, instead of spending £6000 or £7020 as anticipated by the Gas Committee, they were to adopt the electric light, he believed they would be able to save about £300 a year to the ratepayers. Mr. Denney added something about the desirableness of Teignmouth being up to date; while Mr. R. England spoke of an 8 per cent. dividend paid by the Taunton Electric Light Company. With so brilliant a prospect before them, the councillors adopted the recommendation, and decided that the subject should be considered by the Gas and Highways Committees jointly.

Fire at the Liverpool Gas-Works.—Shortly after six on Monday morning last week, a fire occurred at the Eccles Street works of the Liverpool United Gas Company. It was ascertained that the gas in one of the boxes in the purifier-house had become ignited; and the flare set light to some portion of the building. The fire was subdued by means of the extinguishing apparatus kept on the works.

The Effect of a Pure Water Supply.—Upon the presentation of the annual report of the Medical Officer at the meeting of the Newark Corporation yesterday week, the Mayor (Alderman Pratt) pointed out that, prior to the introduction of the new water supply, there had been a yearly average of 81 cases of typhoid fever in the town; but since the old wells had been closed, and the new water used, there had only been an average of seven cases reported. During the past year, there had only been 22 deaths from consumption, while the yearly average used to be 41; and this pleasing decrease was, according to universal medical opinion, largely to be attributed to the use of the pure water obtained by the Corporation from Edingley.

Dissension in the Colwyn Bay and Conway Water Board.—About five years ago, a scheme was adopted by the representatives of the local governing bodies of Colwyn Bay and Conway for a joint supply of water to the district covered by them from Lake Cowlyd. By dint of continual agitation, the Colwyn Bay and Llysfaen representatives some time ago succeeded in carrying a resolution that the small mains running between Sarn Mynach and Llysfaen should be replaced by larger ones. The representatives of the Conway Corporation strongly fought against this, on the ground that it was a scheme for the exclusive benefit of Colwyn Bay and Llysfaen. They were, however, outvoted; and thereupon an appeal was made to the Local Government Board to arbitrate in the matter. This the Local Government Board declined to do. In the meantime tenders had been invited for the work; and a meeting of the Board was held last week to consider the proposals submitted. A stormy discussion arose on the question; but ultimately it was decided to open the tenders, and to accept that of Mr. Sheffield, of Rhyl, which was £7995. The Conway members declined to vote. It is understood that there will be a deputation to the Local Government Board with the view to a settlement.

METROPOLIS WATER SUPPLY.

The Official Water Examiner on the Filtration of London Water.

In the last report (for November, 1896) made to the Local Government Board by the Official Water Examiner for the Metropolis—Major-General A. de Courcy Scott, R.E.—he makes the subjoined remarks on the filtering arrangements of the London Companies.

The following extract from my report to the Board for the month of January, 1893, bears on the question of filtration, and may usefully be repeated at the present time: "On the 31st of August, 1892, the Board, in view of the prevalence of cholera on the Continent, its possible introduction into this country, and the importance of the efficient filtration of the Metropolitan Water Supply, requested the particular attention of the Directors of the Water Companies to the following points: (1) That every effort should be made to maintain the layer of sand in each filter at the greatest practicable thickness. (2) That the rate of filtration should be as slow as possible, consistently with the supply of the required quantity of water. (3) That the sand removed from the surface of the filters with the deposit should, if it was to be replaced in the filter, be completely freed from all taint of organic matter. It is an opinion generally held by bacteriologists who have studied water filtration from their own point of view, that the longer a filter has been in use, the more bacterially effective it becomes, and that the cleansing of the surface should be performed as seldom as possible. This opinion is grounded on the results of experiments. It is necessary to guard against the conclusion which might follow, that the return to the filter of dirty or imperfectly washed sand is a course which is necessarily safe and even expedient. The sand removed from the surface of the filters, together with the mud, and impurities, mostly of vegetable, but to some extent of animal origin, is deposited in heaps, where it remains for some months, so that processes of decay and putrefaction are set up. The net bacterial result of these processes is undetermined, and may be totally different from that which obtains on the surface of the sand under water. This consideration, independently of those which may be called sentimental, indicates the desirability of the thorough washing of the included sand before its replacement on the filters."

Nothing has occurred in connection with bacteriological investigations carried out since the above-mentioned report was written which would indicate that the precautions suggested in any respect need modification.

Regulations have been issued by the German Government in regard to the filtration of surface waters used for public water supply. In the 15th of the regulations, the following occurs: "Special attention must be given to the upper layer of sand, which must be arranged and continually kept in the condition most favourable for filtration. For this reason, it is desirable that, after a filter has been reduced in thickness by scraping, and is about to be refilled, the sand below the surface, *so far as it is discoloured*, should be removed before bringing on the new sand." The words italicized by me show that the removal of organic *débris* from the sand is considered necessary by the department controlled by Dr. Koch.

Instructions drawn up three years ago by Professors Frankland and Dewar, with reference to the manner in which filtration should be carried out, prescribe, among other things, that after a filter has been recharged with water an interval of rest should follow during which sedimentation may take place, causing the formation of a skin or layer of slime or mud which apparently constitutes the most effective portion of the filter, from the point of view of bacterial interception.

The foregoing observations are necessary because certain portions of a report of the Chemist to the London County Council, dated Jan. 30, 1896, which has recently been under the consideration of the Board, might lead to the conclusion that the generally successful efforts of the officials of the Water Companies to carry out the work of maintaining the cleanliness of the sand placed from time to time on the filters are misdirected, and, in fact, worse than useless.

The London Reform Union and the Water Question.

A conference on the London Water Question, convened by the London Reform Union, was held in the hall of Clifford's Inn, Fleet Street, last Thursday. Mr. Passmore Edwards occupied the chair; and there was a large attendance of members of the Union. Mr. W. H. Dickinson, the Chairman of the Water Committee of the London County Council, said it was of the greatest importance that some settlement of the question should take place at the earliest possible moment; and it was in view of this fact that the Council last July resolved once again to bring in their Bills. The Government, he thought, would be making a great mistake if they used the weight of their national majority to prevent the Council from coming into their heritage of the water supply of London. He trusted they would say this was a question which ought to be left to a Committee of the House to be argued out fairly; and he was certain that if this were done the Council would be able to show they had a good case. With regard to the future, he advocated the adoption of the Welsh supply in preference to one obtained from the Thames and stored in reservoirs. To supply the additional 200 million gallons of water which would be required in 1931 by means of storage would, he said, involve a capital expenditure equal to £20,000,000 sterling; whereas a capital expenditure of only £19,000,000 would be required for the same quantity of water if it were obtained from Wales. Mr. D. White moved—"That this meeting is of opinion that the settlement of the question of the London Water Supply should be pressed forward without delay; and that the policy of the Bills promoted by the London County Council for the purchase by that body, as representing the London consumers, of the undertakings of the eight Metropolitan Water Companies is one that should command the assent of Parliament." The motion was agreed to.

A Church's Saving by Incandescent Gas Lighting.—The Slough Parish Church was fitted up with incandescent lights in September last, with the result that there has been a considerable saving in the gas account. The consumption during the succeeding quarter was 26,000 cubic feet less than in the corresponding period of 1895.

THE REIGATE CORPORATION AND THE EAST SURREY WATER COMPANY.

The Corporation's Bill to be Withdrawn.

As our readers are aware, the Corporation of Reigate have promoted a Bill to "define and regulate the rates and charges of the East Surrey Water Company for the supply of water within the borough of Reigate, and to amend the Acts of the said Company so far as they affect the said borough." The general question covered by the Bill was entrusted to a Committee of the Corporation; and at their meeting on the 14th ult., they had before them an important communication from the Chairman of the Company (Sir F. Bramwell) in reference thereto. In the course of his letter, which was addressed to the Mayor (Mr. H. Ongley), Sir Frederick expressed regret that the Corporation should not have made any overtures to the Company previously to introducing a measure of so hostile a nature. He went on to say that while there were many points in the Bill which the Company were not prepared, under any circumstances, to discuss, they were desirous of meeting, so far as they could, the views of the Corporation upon the questions raised by clauses 3 and 4—viz., the supply of water for baths, closets, and public purposes. He informed the Mayor that these questions had been under the consideration of the Directors for some time, and before the subject of the promotion of the Bill had been raised in the Council. With this object in view, and on the understanding that the settlement of these matters would dispose of the Bill, the Company would agree that the following reduced charges should in future be made: For water supplied to the Corporation for public purposes, 1s. per 1000 gallons. For baths and extra water-closets: In each house of £50 annual value and upwards—a bath, 15s.; extra water-closets, 7s. 6d. each. In all houses below £50 annual value—a bath, 10s.; each extra water-closet, 5s. The Corporation, it should be mentioned, asked in their Bill for the supply of water for closet-flushing purposes free, for the limitation of the bath charge to 7s. 6d. per annum, and for water for public purposes to be sold by meter at not more than 8d. per 1000 gallons. The letter having been considered by the Committee, it was unanimously resolved to recommend the Council to accept the terms offered, and to instruct the Solicitor (Mr. Mole) to communicate the resolution to Sir F. Bramwell, accompanied by a request that the Company should consider whether they could not consent to the abrogation of section 34 of the East Surrey Water Act, 1885, so far as concerned the borough. This section provides that where any part of a dwelling-house is used by the occupier for trade or business purposes for which water is required in addition to the ordinary domestic supply, the Company shall not be bound to furnish water to such house otherwise than by special agreement. A subsequent section enacts that the Company shall not be compelled to supply water to the occupier of any part of a dwelling-house or building divided into separate tenements, unless the water is paid for for the whole house.

The subject came before the Council at their meeting on Monday last week, when the Chairman of the Committee (Mr. Viall) submitted a resolution formally sanctioning the promotion of the Bill. He explained that this was not done in any spirit hostile to the Water Company, but simply in order that the expenses already incurred in connection with the Bill might be chargeable upon the borough fund. The resolution having been carried *nem. con.*, Mr. Viall moved the reception of the Water Committee's report containing the recommendation above referred to. He explained that the Committee were of opinion that the terms offered by the Company met the principal objection to the present charges. They secured a reduction to every person who had either a bath or a second water-closet, and a considerable concession to the smaller householders. They also secured a reduction of nearly one-third of the charge for water for public purposes. The old charge of 1s. 4d. or 1s. 6d. per 1000 gallons might have been increased by the Company terminating the existing agreement with the Corporation; but the new agreement would be irrevocable, and would thus benefit the ratepayers in perpetuity. With regard to the instruction to the Solicitor to ask the Company to consider the possibility of abrogating section 34 of the Company's Act of 1885, that gentleman had written to Sir F. Bramwell reminding him that, when the Company's Bill was before Parliament last session, the Local Government Board, in their report on the matter, pointed out that the power conferred by the section in question was exceptional, and suggested that it should be repealed; and the Committee felt it was one which might be exercised harshly, to the detriment of the borough. Sir Frederick, in reply, expressed his gratification to find that the Water Committee were prepared to settle the whole question on the terms suggested in his letter to the Mayor. With respect to the desire expressed that the Company would consent to the abrogation of section 34 of their Act of 1885, he said his colleagues would be prepared to agree to supply by meter all houses partly used for any trade or business, provided that the minimum payment for each supply was not less than the amount of the charges that would be payable if the whole of the premises were used for domestic purposes. The Directors anticipated that this would entirely satisfy the Committee; and the Company would be prepared to agree, under seal, to these conditions, and to the stipulation as regards the supply of water for baths, closets, and public purposes, contained in his previous letter—the Corporation joining in the agreement for the purpose of undertaking to withdraw the Bill, and so dispose of it. He added that the Directors proposed that the reduced charges should begin as from Michaelmas last. Mr. Viall proceeded to say that, under the circumstances, the Committee thought the best thing they could possibly do was to ask the Council to accept the Company's terms; and a little later on he would be prepared to propose that they withdraw the Bill. Having read some correspondence which had taken place with Messrs. Sherwood and Co., the Parliamentary Agents for the Corporation, he proposed—"That the terms of the East Surrey Water Company be hereby approved, and that Mr. Mole be instructed to prepare a deed embodying such terms, and obtain the seal of the East Surrey Water Company thereto; whereupon, the Bill in Parliament be withdrawn." The Mayor remarked that the latter part of the motion could come as an addendum to the Committee's recommendation. This was subsequently done, and the entire proposition was unanimously agreed to.

Referring to the above subject, the "Surrey Gazette" last Friday made the following remarks: "There is an old saying that 'all's well that ends well,' and it has been verified in the result of the negotiations between the East Surrey Water Company and the Corporation of Reigate, in the matter of the water supply of the borough. Last week we hinted that it was on the boards that a compromise would be arrived at between the Council and the Water Company; and this week we are able to record a complete understanding between them. The thanks of the inhabitants are due to the Water Company for the concessions made, and to Mr. Councillor Viall, who has been mainly instrumental in bringing about, without an appeal to Parliament, that which he and those who were prepared to support him would almost certainly have failed to do had they gone to Westminster with the object of obtaining compulsory powers. A perusal of the correspondence in reference to the matter, will go a long way to convince any thinking man of the expense the ratepayers have been spared by the compromise arrived at in respect of the promotion of a Bill in Parliament which practically asked that august body to stultify and rescind in favour of the Town Council certain powers it had solemnly conferred on the East Surrey Water Company. Our view of the failure of the Corporation in any such enterprise has been expressed in this column over and over again; and if anything which could appear in print could confirm our opinion of the situation, it is an article which appeared in last Tuesday's issue of the 'JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.' [The article referred to is then reproduced *in extenso*.] This article will serve to show the ratepayers of the borough and the Council how much they are indebted to the Water Company, in voluntarily making the concessions they have, without asking anything in the shape of a *quid pro quo*, and which might have been had for the asking without spending a penny of the ratepayers' money."

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

A very important step was taken on Wednesday by the Committee in charge of the negotiations for filling up the Edinburgh vacancy, in the selection of the short leet from which the appointment will be made. The names selected are: Mr. J. F. Bell, of Stafford; Mr. W. Ewing, of Hamilton; Mr. W. R. Herring, of Huddersfield; Mr. R. H. Townsley, of Leeds; and Mr. A. Wilson, of Dawsholm, Glasgow. This list has created some surprise; but when everything is taken into account, it need not. The Committee have simply put in force, firmly, the limitations which I mentioned a fortnight ago, with the result that the names of some which are as household words are not included. The temptation must have been strong to give the appointment to as prominent a man as possible; and on this point, whether one agrees with the Committee or not in laying down conditions among themselves which they did not make known to the candidates, they deserve credit for having stuck to the position they took up before they knew who would apply. Resolutions formed beforehand are so apt to be influenced by the circumstances when they arise, that it would not have been much to be wondered at if, when the applications came in, the regulations which had been agreed upon had been relaxed in favour of someone of outstanding eminence who did not, in all respects, comply with the conditions. It is just possible that something of this sort may be done, or attempted, before the appointment is made, for the Committee is only a fraction of the Commission. As yet, however, there has been no indication of such. A consistent course was the only safe one for the Committee. To have departed from their agreed policy in one particular, would have meant the shelving of the whole of the conditions; and a scramble among the wire-pullers would have ensued. I can quite understand the mortification, even the chagrin, of many of those who have applied, at not finding their names on the short leet; but as to that, I have two remarks to make. In the first place, I gave all and sundry timeous warning, if they felt that they did not conform to the requirements of the Committee, to enable them to withdraw. At all events, supposing they did not take my statement to be correct, they had opportunity to communicate with the Committee, to ascertain whether the conditions I mentioned were to be enforced; and, if so, then they could have made up their minds whether they would go on or not. The other remark is that if any gentlemen who may consider themselves of greater calibre than those who have been selected have been passed over, they may console themselves with the reflection that the conditions were such as to confine the choice of the Committee within a very narrow circle. The age limit was responsible for many being set aside. Then there were some who were good on the chemical side, but had not had much practical experience; and there were others who had large practical experience, but who were not so well up in theoretics. Over and above this, there were some who were satisfactory on all points except that they had not had experience in designing. With these explanations, it will be easily understood how many who might have been expected to be on the list are not.

As to the list which has been selected, I may say at once that I am entirely unacquainted with the three English gentlemen, or with their work, further than a casual knowledge derived from a not very close perusal of their writings, or reports of their works, as they may have appeared in the "JOURNAL." Of the two Scotch gentlemen, Mr. Wilson is the only one with whom I am personally acquainted. But I know well the work which both he and Mr. Ewing have been doing—if anything, perhaps Mr. Ewing's the best; this being accounted for by the fact that the results of working at the individual stations of the Glasgow Corporation are not made public. However, I am aware that both of the Scotchmen are exceedingly well fitted for the post; and I am assured by those who know the Englishmen, that they also all possess excellent capabilities—one of them, at least, exceptionally so. This is the local feeling, not my own, which I do not express, because someone might come forward and say I had spoiled his chance—a circumstance I would very much regret.

The appointment will probably be made almost immediately. There is little to be done now except the inspection of works, which is almost a formality, and then a final meeting of the Committee; and the Commissioners may be called together, say on Monday week, to proceed to the appointment.

The Edinburgh and Leith Gas Commissioners held a meeting on Monday; but they had little business before them. There was a gratifying report regarding the output of gas, showing that for the month of December it was 6,059,000 cubic feet more than in the same month of the previous year; and that for the period from May 16, it was 49,996,000 cubic feet more than in the corresponding time of 1895. On the recommendation of the Committee on Finance and Law, the Commissioners adopted a suggestion which had been made by the Portobello Gaslight Company, to the effect that the obligation of the Corporation of Edinburgh to pay the annuities due to the shareholders of the Company should not be cancelled, as is proposed in the Bill which the Edinburgh Corporation are promoting.

There are great complaints at Falkirk, on account of want of pressure in the gas. The supply is so defective that public attention has been called to it. What the unsophsticated cannot understand is why, with their new holder, the Gas Commissioners cannot send out more gas. They do not know that the holder is not yet connected with the mains in the district in which it stands, and is only as yet a reserve. The town is supplied with gas through the mains from the works, as it was before; and though the Commissioners have resolved to lay new mains, the work is not to be undertaken till the spring, when the demand for gas will be less. Later on a governor-house will be built at the new holder; and it will then be used to supply the district immediately beside it. The consumption of gas has increased so much that it has outgrown the mains. By next lighting season, the matter of pressure should be all right, as the new mains and the new holder will then be in full operation.

The Dunfermline gas transfer was completed yesterday on the payment by the Corporation of the money awarded, together with the price of stocks, to the Gas Company. The Corporation have obtained a loan from the Commercial Bank of Scotland for three months at 3½ per cent. It is the intention of the Gas Committee to recommend the adoption of the Loans Act, and to then raise a local loan by the issue of Corporation stock. The sum received by the Gas Company is equal to £41 2s. 6d. per share. The shares were £25 each, nominal value; but some were sold before the arbitration proceedings for £29 10s. each. The meddlesome person I spoke of a fortnight ago appears to be still in existence. At a meeting of the Town Council this week, the question was raised as to whether the Gas Company could not be made to bear half the cost of the transfer. Of course, it was stupidity to propose such a thing. The Lands Clauses Act says, most distinctly, that not only the costs of the arbitration, unless in cases where the promoters shall have offered more than is awarded, but also the entire cost of conveyance, must be borne by the promoters.

The Directors of the Moffat Gaslight Company recommend that, after making the usual allowance for depreciation, a dividend at the rate of 5 per cent. be paid on the guaranteed shares, and of 8 per cent. on the ordinary shares, and £83 carried forward.

The negotiations between the Stirling Gas Company and the Corporation, with reference to the proposed transfer, are still proceeding. As I stated last week, there was brought forward, at the meeting of shareholders of the Company, a proposal for a reference to the Sheriff of the county, with power to him to take into consideration an allowance for compulsory sale. The Corporation seem to object to this element being introduced, for they have been in communication with the Directors of the Gas Company on the subject; and the Directors held a meeting yesterday to consider the communication. The result has not been made known.

It may be remembered that in October, 1895, while two waggons of coal were being taken into the Dumfries Corporation Gas-Works, an employee of the Glasgow and South-Western Railway Company, who was in charge of the first waggon, was crushed between the buffers and killed. There is a tramway, about 400 yards long, between the railway and the gas-works, along which waggons are hauled by horses; and the contract for the haulage is undertaken by the Glasgow and South-Western Railway Company. A great proportion of the coal which is used in the works comes from Lanarkshire, over the lines of the Caledonian Railway Company. That was the case in this instance; the coal having been carried in Caledonian waggons, which were handed over to the Glasgow and South-Western Company in the railway yard at Dumfries. The widow of the man who was killed has raised an action for damages against both Railway Companies. The relevancy of the action was admitted by the Glasgow and South-Western Company, but not by the Caledonian Company, who said they had nothing to do with the waggons at the time of the accident. The pursuer's averment against the Caledonian Company was that the waggons were defective in respect that they were not fitted with brakes. The question of relevancy was disposed of in the Second Division of the Court of Session on Thursday. Lord Young and the Lord Justice-Clerk declined to throw out the case as irrelevant, without knowing the circumstances of the arrangement between the two Railway Companies as to the use of the waggons, as they could not bring themselves to believe that the Caledonian Company gave the use of their waggons gratuitously to the Glasgow and South-Western Company. Lord Trayner, on the other hand, held that the action, as against the Caledonian Company, was not relevant; the pursuer's own statement being that the waggons were there for the convenience of the Glasgow and South-Western Company. In terms of the opinion of the two former judges, the case will go to trial as against both Companies, upon separate issues; and it will be for the presiding Judge at the trial to determine the question of relevancy as against the Caledonian Company. In view of the enormous amount of traffic by waggons over the lines of other railway companies, it will be interesting to see how the question of liability may be decided. Employees in gas-works have daily to handle waggons which do not belong to the company delivering the coal; and it is of interest to them to know against whom they might recover damages. I may say that one of the leading Counsel in the case described the judgment as "most erratic;" and there is thus a probability of its being taken to the House of Lords.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Jan.* 30.

Sulphate of Ammonia.—Prices have again been somewhat irregular during the week; but, notwithstanding this, a fair business is passing. The lower quotations disseminated by dealers on the Continent have tended to deter consumers making purchases; and foreign orders are scarce. Dealers' requirements are not, however, fully satisfied; and the purchasing going on is mostly for their account. Quotations for prompt delivery are £7 17s. 6d. per ton f.o.b. at the ports. In respect to forward delivery, the position is practically unchanged; speculators offering delivery over the next few months at a very slight premium on spot prices.

Nitrate of Soda.—With regard to cargoes, the market is sustained by the large operators buying up any outside cargoes which may be offered. For spot, the market is firm at 8s. 3d. per cwt.

LONDON, *Jan.* 30.

Tar Products.—Business generally is not good; and lower prices seem to be in front of distillers. Though benzol is undoubtedly scarce, sellers having oversold, values are inclined to languish. Creosote and tar oils are all weak; makers holding large stocks. There is more inquiry for carbolic acid; but the tendency is to lower rates. A large business in anthracene is also reported, at prices below the Committee's ideas of value. The pitch market is decidedly bad; buyers holding off in the most unaccountable manner, as it is known that users have no stocks. Tar is weaker, and likely to see lower prices.

To-day's values are: Tar, 18s. to 23s. 6d., according to position and terms of delivery. Pitch, west coast, 22s.; east coast, 24s. Benzols, 90's, 3s. 3d. to 3s. 6d.; 50's, 2s. 10½d. Solvent naphtha, 1s. 7d. Crude, 30 per cent., naphtha, 1s. 1½d. Creosote, 1¼d.; liquid, 1⅛d. Heavy oils, 35s. Naphthalene, 65s.; salts, 30s. Carbolic acid, 60's, 2s. Anthracene, "A," 8⅜d. to 9½d.; "B," 7d. to 8d.

Sulphate of Ammonia.—The demand has slackened off and the market is lower; business having been done at £7 15s. to £7 17s. 6d., less 3½ per cent. at all ports. Makers are busy delivering against important sales effected during the recent advance in prices, and are at present easy as regards the fluctuations taking place in the market,

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The severe weather of the past week has necessarily brought forward an increased demand for house coals; and not only are pits kept fully going, but stocks have had to be drawn upon in order to meet requirements of customers. This renewal of activity has naturally caused some talk about raising prices; but the month has closed with no alteration in list rates, which are, however, very firm at recent quotations. Steam and forge coal are moving away readily, with a hardening tendency in prices. Supplies of engine fuel are becoming increasingly plentiful, owing to the larger quantity of slack now being produced, as a result of the activity in the round coal trade. But except here and there for immediate clearances of surplus lots, there is no giving way in prices. At the pit mouth, best Wigan Arley averages 10s. 6d. to 11s. per ton; Pemberton four-feet and seconds Arley, 8s. 6d. to 9s.; good steam and forge coal, 6s. 6d. to 7s.; common slack, 3s. to 3s. 6d.; good medium sorts, 4s. to 4s. 3d.; and best qualities, 4s. 6d. up to 5s. The shipping trade is active, with 7s. 9d. to 8s. per ton about the average figures for steam coal, delivered at Mersey ports.

Northern Coal Trade.—The stormy weather has greatly affected the coal trade of this district, fleets of steamers having been detained many days; and the working of several collieries has been much deranged in consequence. On Friday, these steamers began to arrive; and the output at the collieries has now become normal in extent. Best Northumbrian steam coals have been quoted at 7s. 9d. to 8s. per ton for immediate delivery; but for delivery over the season, as high as 9s. is asked, and, it is believed, has been paid in one instance. Second-class steam coals are about 7s. 6d. per ton f.o.b. for prompt delivery; and steam smalls are plentiful at 3s. per ton, with a higher quotation for deliveries spread over the shipping season. In the gas coal trade, there has been a limitation of shipments, owing to the cause named; but extremely heavy quantities are now being shipped. The price quoted varies very much with the different collieries, according to the quantity that remains after contracts are met; but from 7s. to 7s. 6d. per ton f.o.b. may be taken as the general quotations, though even higher rates have had to be paid to secure supplies of best Durham gas coals. Gas coke is unaltered this week.

Scotch Coal Trade.—There is still a tone of firmness in the market; the shipping trade continuing active, and the home trade, on account of the cold weather, being also large. Trade generally is good, with the result that coal for industrial purposes is in great demand. Ell, which is largely appreciated abroad, is booked forward, in many instances, for some time to come; and this is a very hopeful feature. The prices quoted are: Main, 6s. 9d. per ton f.o.b. Glasgow; ell, 7s. to 7s. 3d.; and splint, 7s. 6d. The shipments for the week amounted to 142,867 tons—an increase of 21,543 tons over the preceding week, and of 19,716 tons over the corresponding week of last year. For the year to date, the total shipments have amounted to 379,393 tons—an increase over the same period of last year of 19,040 tons.

The Weymouth Corporation and the Gas and Water Companies.—According to all appearance, there will be a big parliamentary fight over the Bills promoted by the Weymouth Gas and Water Companies, in consequence of the attitude taken up by the town, as exemplified at the meeting of ratepayers reported last week. The Gas Company met on the 28th ult., and unanimously passed a resolution sanctioning the Bill to extend their limits of supply and confer additional money powers. This action is regarded by the local Press as a determination to fight; and the coming struggle will doubtless prove a memorable one in the history of the town.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST (see ante, p. 228).

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	15 Oct.	10½	Alliance & Dublin 10 p. c.	23—25	..	4 4 0
100,000	10	,,	7½	Do. 7 p. c.	17¾—18½	..	4 1 1
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	108—111	..	4 10 11
200,000	10	29 Oct.	5	Belgrano (B. Ayres), Limited	10—10½	..	4 15 3
100,000	Stck.	30 Dec.	5	Do. 5 p. c. Deb. Stk	102—105	..	4 15 3
200,000	5	12 Nov.	6½	Bombay, Limited	6—7	−¼	4 5 9
40,000	5	,,	6½	Do. New, £4 paid	4—5	−½	4 16 0
380,000	Stck.	13 Aug.	12	Brentford Consolidated	293—295	..	4 1 4
210,000	,,	,,	9	Do. New	225—230	..	3 18 3
50,000	,,	,,	5	Do. 5 p. c. Pref.	140—145	..	3 9 0
159,375	,,	11 Dec.	4	Do. 4 p. c. Deb. Stock.	130—134	..	2 19 9
220,000	Stck.	16 Sept.	11½	Brighton & Hove Original	270—275	..	4 3 7
208,820	,,	,,	8½	Do. A Ord. Stk.	187—192	..	4 8 7
933,500	Stck.	28 Aug.	5	Bristol, 5 p.c. max.	127—132	..	3 15 9
420,000	20	15 Oct.	11¼	British	56⅞—57½	+⅜	3 18 3
50,000	10	28 Aug.	11½	Bromley, Ordinary 10 p. c.	24—26	..	4 8 6
71,000	10	,,	8½	Do. 7 p. c.	19—21	..	4 0 11
500,000	10	15 Oct.	6	Buenos Ayres (New) Limited	10—10⅛	−⅛	5 14 3
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	101—103	..	5 16 6
150,000	20	15 July	8½	Cagliari, Limited	29—31	..	5 6 5
100,000	10	30 Sept.	6	Cape Town & District, Ltd.	15⅝—16½	..	3 12 9
50,000	50	3 Nov.	6	Do. 6 p. c. 1st Mort.	57—59	..	5 1 8
550,000	Stck.	15 Oct.	13½	Commercial Old Stock	338—343	..	3 18 8
165,000	,,	,,	10⅚	Do. New do.	255—260	..	4 0 9
165,000	,,	11 Dec.	4½	Do. 4½ p. c. Deb. do.	150—155	..	2 18 0
800,000	Stck.	30 Dec.	13	Continental Union, Limited.	260—265	..	4 18 1
200,000	,,	,,	10	Do. 7 p. c. Pref.	215—220	..	4 10 11
51,600	Stck.	28 Aug.	14	Croydon Com'cial A 10 p. c.	315—320	..	4 7 6
163,400	,,	,,	11	Do. B 7 p. c.	250—255	..	4 6 3
535,000	Stck.	28 Aug.	5½	Crystal Palace Ord. 5 p.c. Stk	140—143	..	3 13 5
60,000	,,	,,	5	Do. 5 p. c. Pref.	140—145	..	3 9 0
486,090	10	15 July	11	European, Limited	25—26*	..	4 3 0
354,060	10	,,	11	Do. £7 10s. paid	17½—18½*	..	4 6 11
5,746,590	Stck.	13 Aug	12¾	Gaslight & Coke, A, Ordinary	318—323	..	3 19 0
100,000	,,	,,	4	Do. B, 4 p. c. max.	110—115	..	3 9 7
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	305—315	..	3 3 6
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	147—152	..	3 5 9
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	212—217	..	3 9 1
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	207—212	..	3 6 0
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	305—315	..	3 3 6
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	178—183	+3	3 5 7
1,061,150	,,	11 Dec.	4	Do. 4 p. c. Deb. Stk.	137—142	..	2 16 4
294,850	,,	,,	4½	Do. 4½ p. c. do.	150—156	+1	2 17 8
908,000	,,	,,	6	Do. 6 p. c. do.	207—212	+4	2 16 7
70,000	10	29 Oct.	6	Hongkong & China, Limited	12—13	..	4 12 4
3,800,000	Stck.	12 Nov.	12	Imperial Continental	222—226	+2	5 6 2
376,400	100	1 Aug.	4	Do. 4 p. c. Debs. Red.	100—103	..	3 17 8
473,600	Stck.	13 Aug.	3½	Do. 3½ p. c. Deb. Stk ,,	105—108	..	3 4 10
75,000	5	11 Dec.	6	Malta & Mediterranean, Ltd.	6—6½	..	4 12 4
560,000	100	1 Oct.	5	Met. of Melbourne, 5 p. c. Deb.	111—115	..	4 6 11
250,000	100	,,	4½	Do. 4½ p. c. Debs.	109—111	..	4 1 1
541,920	20	12 Nov.	5	Monte Video, Limited	15½—16½	..	6 1 3
150,000	5	26 Nov.	8	Oriental, Limited	8⅛—9	..	4 8 11
135,000	5	,,	8	Do. New, £4 10s. paid	7⅞—8	..	4 10 0
15,000	5	,,	8	Do. do. 1879, £1 paid	1⅞—2	..	4 0 0
60,000	5	16 Sept.	7	Ottoman, Limited	5—5½	..	6 7 3
420,000	100	2 Nov.	6	People's Gas } 1st Mtg. Bds.	100—105	..	5 14 3
500,000	100	1 Dec.	6	of Chicago } 2nd Do.	100—105	..	5 14 3
250,000	10	30 Sept.	10	San Paulo, Limited	12½—13½	..	7 8 2
5,475,000	Stck.	13 Aug.	5 9/10	South Metrop., 4 p.c. Ord.	145—150	+1	3 9 0
820,000	,,	15 July	5	Do. 5 p. c. Deb. Stk.	169—172*	..	2 18 2
60,000	Stck.	16 Sept.	11½	Tottenham & Edmonton, A	280—290	..	3 19 4
60,000	,,	,,	8½	Do. B	190—200	..	4 5 0
170,380	10	30 Dec.	10	Tuscan, Limited.	14—15	..	6 13 4
149,900	10	2 Jan.	5	Do. 5 p. c. Debs. Red.	101—103	+1	4 17 1
				WATER COMPANIES.			
746,159	Stck.	30 Dec.	10½	Chelsea, Ordinary	333—338	..	3 2 2
150,000	,,	,,	5	Do. 5 p. c. Pref.	175—180	..	2 15 6
160,000	,,	,,	4½	Do. 4½ p. c. Pref. Stk., 1875	158—162	..	2 15 6
175,785	,,	30 Sept.	4½	Do. 4½ p. c. Deb. Stock	162—167	..	2 13 11
1,719,514	Stck.	15 Oct.	7	East London, Ordinary	232—237	+2	2 19 1
654,740	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	162—167	..	2 13 11
225,000	,,	,,	3	Do. 3 p. c. Deb. Stk.	105—107	..	2 16 1
700,000	50	11 Dec.	7½	Grand Junction, 10 p.c. max.	117—122	+2	3 1 6
295,000	Stck.	30 Sept.	4	Do. 4 p. c. Deb. Stk.	150—155	..	2 11 7
708,000	Stck.	13 Aug.	12	Kent	342—347	+2	3 9 2
160,000	,,	,,	7	Do. New, 7 p. c. max.	215—220	..	3 3 7
1,043,800	100	30 Dec.	9⅓	Lambeth, 10 p. c. max.	272—277	+2	3 8 7
406,200	100	,,	7⅓	Do. 7⅓ p. c. max.	222—227	..	3 6 1
350,000	Stck.	30 Sept.	4	Do. 4 p. c. Deb. Stk.	150—153	..	2 12 3
500,000	100	13 Aug.	12 9/10	New River, New Shares	422—427	+2	3 0 8
1,000,000	Stck.	30 July	4	Do. 4 p. c. Deb. Stk.	152—155*	..	2 11 7
902,300	Stck.	30 Dec.	6	S'thwk & V'xhall, Ordinary	154—159	+1	3 15 6
126,500	100	,,	6	Do. Do. 7½ p. c. Max.	149—154	..	3 17 11
489,200	Stck.	,,	5	Do. Do. 5 p. c. Pref.	175—180	..	2 15 7
1,019,585	,,	30 Sept.	4	Do. 4 p. c. A Deb. Stk.	148—151	..	2 13 0
1,155,066	Stck.	11 Dec.	10	West Middlesex	310—315	..	3 3 6
200,000	,,	,,	4½	Do. 4½ p. c. Deb. Stk.	163—168	..	2 13 7

*Ex div.

The Arundel Gas Company's Incorporation to be Opposed.—The gas question is assuming importance at Arundel. The Directors of the Arundel Gas Company have been for some time contemplating the raising of additional capital; and in order to carry out the scheme, they have decided on applying for incorporation. These proposals have come under the notice of the Town Council; and it has been suggested that the Corporation should endeavour to induce the Company to withdraw or amend their Bill, oppose it, or take steps to purchase the works. The Corporation have resolved to oppose the Bill.

The Fylde Water-Works Purchase Question.—The polling of the ratepayers of Blackpool and Fleetwood with regard to the proposed acquirement of the undertaking of the Fylde Water Company by the Local Authorities has been completed; and the result shows a substantial majority in favour of the purchase being carried out by Legislative enactment. At Blackpool, the voting was as follows: For the scheme, 5345; against it, 1140—majority for, 4205. Altogether, there were 8376 voting-papers delivered; so it will be seen that nearly half of the ratepayers did not vote upon the question. In the case of Fleetwood, the voting was: For the purchase, 1448; against it, 64—majority for, 1384. The counting of the votes at Lytham and St. Anne's takes place to-morrow (Wednesday); and a great deal of interest is being felt in the result. At a public meeting held at St. Anne's last Thursday, a resolution in favour of the Bill was carried by a large majority; while at Lytham, the following night, a similar resolution was adopted by about 40 votes to 8—the majority of those present refusing to vote at all.

The Matlock Bath District Council and their Gas Undertaking.—The transfer of the works of the Matlock Bath Gas Company to the District Council at the commencement of the year did not, as our readers are aware, take place without some unpleasantness; and one difficulty which has arisen in connection with this matter may have to be settled in the Law Courts. After the purchase-money had been paid, the Committee of the Council who had conducted the negotiations informed the representatives of the Gas Company that the new owners of the property claimed all the assets standing at the date of the transfer, including all the quarter's gas accounts due on the 31st of December. In support of the claim, the Committee produced an opinion they had obtained from Mr. Cozens-Hardy, Q.C. The amount at issue is variously stated to be from £600 to £800. Fourteen days' grace was asked for and given; and we now learn that notice has been given by the Solicitor of the Gas Company to the District Council that the latter would collect the disputed accounts at their peril, the Company having also obtained Counsel's opinion on the matter. A deadlock has ensued; and the gas consumers are in the difficult position of not knowing whether to pay the Company or the Council. Correspondence has taken place between the parties with the view to a joint application being made to the High Court of Justice for the question to be referred back to Sir W. Coddington, M.P., the Arbitrator, under the provisions of section 10 of the Arbitration Act, 1889.

The Water Supply of North Tawton.—The Local Government Board have had under consideration the application of the Okehampton Rural District Council for power to borrow £2500 for works of water supply at North Tawton. In a letter addressed to the District Council the Board point out that a supply of 15 gallons per head per day should be provided, if it can be done at reasonable cost; and they say that it will regard 10 gallons per head as the minimum supply which could be accepted. The District Council have decided to carry out experimental works, with the object of testing both the sufficiency and wholesomeness of the proposed supply, before proceeding further with the application for the loan.

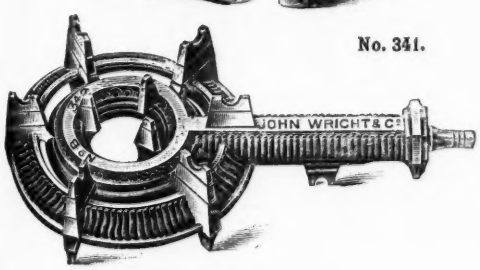
The Price of Gas at Sydney (N.S.W.).—We notice elsewhere that the Australian Gaslight Company commenced the New Year by reducing the charge for gas to private consumers and for the public lamps; the prices being now 4s. 3d. per 1000 cubic feet and £4 5s. per lamp. As most of our readers are aware, the Australian colonies have of late been passing through seasons of great depression; and Sydney, with the other large cities, has felt the effects very severely. Yet, notwithstanding this fact, the Australian Gaslight Company have evidently gone on their way most successfully; for we find that not only has the usual dividend of 15 per cent. been regularly paid to the shareholders during this period, but the price of gas has been reduced from 5s. 3d. to 4s. 3d. per 1000 cubic feet, and the charge for the public lamps from £4 15s. to £4 5s. each per annum. These facts speak volumes for the ability with which the Company's affairs are managed. We congratulate the Directors and the officers—especially the Secretary (Mr. R. J. Lukey) and the Engineer (Mr. T. J. Bush)—upon the success which has attended their labours in the past, and trust similar prosperity awaits them in the future. The latest sales of the Company's £6 shares have reached £16 apiece.

Fires Caused by Artificial Lighting, &c.—There were 3616 fires in London last year; and the Chief Officer of the Fire Brigade (Commander Wells) is able to explain the causes of 2725 of them. Among these, artificial lighting in its various forms figures very prominently. Mineral-oil lamps and stoves were responsible for no fewer than 512 outbreaks, or 14 per cent. of the total number; gas occasioned 345 fires, or 9 per cent.; and candles 229, or about 6 per cent. The danger arising from the use of mineral-oil lamps, particularly those of the cheaper sort, is illustrated by the fact that 301 fires were due to lamps being upset, and 107 to explosions of lamps, in addition to which 46 fires are ascribed to oil-lamps without further explanation, and 29 were due to explosions or other mishaps with oil-stoves. Of the fires due to gas, 10 were caused by explosions, 74 by escapes, 25 by searching for leakage with a light, and 18 by overheat of gaslight. Swinging gas-brackets caused 40 fires; gas-fitters were responsible for 11; the act of lighting led to 14 outbreaks; and 108 were due to curtains, decorations, or goods coming in contact with lights. There were 35 fires through the use of gas-stoves; nearly one-half of them being caused by portable stoves.

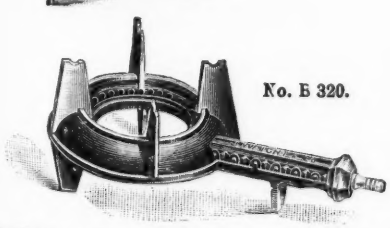
WRIGHT'S

RAPID GAS-GRILLERS & BOILING-STOVES

No. B 628.



No. 341.



No. B 320.

SUITABLE FOR USE WITH

PREPAYMENT METERS.

This Broiler is made entirely of **Cast Iron**, and is fitted with a most powerful Burner. The Waste Heat is utilized for boiling. It will cook two Chops and boil a Kettle **at the same time.** Connections may be readily removed from left to right, or *vice versâ*.

No.	Outside Dimensions. Width.	Depth.	Height.	PRICE complete with Pan and Grid.
B 628	12	8½	6½	**6/6**

This Stove is a modification of our celebrated "Concentric" Boiling-Stoves (Nos. 321, 322, and 323), which are universally admitted to be the best and most powerful Gas Boiling-Stoves, for their size, ever made. It is cast all in one piece, burns with a perfect flame, is strong, and cannot possibly get out of order, and is specially made to carry vessels of any size, either large or small.

No. **B 341**, 5½ inches diameter **1/9**
No. **B 342**, 7 ,, ,, ... **2/6**
No. **B 343**, 9 ,, ,, ... **3/6**

A Cheap, Strong Stove, cast in one piece, and plain, so that it can be easily cleaned. This burner has been very largely adopted by The Gaslight and Coke Company, London, and many other principal London and Provincial Gas Companies.

No. **B 320**, 6 inches diameter **1/6**

JOHN WRIGHT & Co., Ltd., BIRMINGHAM & LONDON.

Reductions in Price.—The Directors of the Farnham Gas Company have given notice of a reduction in the price of gas from 3s. 9d. to 3s. 4d. per 1000 cubic feet. The Sedbergh New Gas Company have reduced their price from 5s. 10d. to 5s. 5d. per 1000 cubic feet for lighting, and to 4s. 6d. for cooking and heating purposes. The Australian Gaslight Company have made a concession of 3d. per 1000 cubic feet to the private consumers, and have lowered the charge for public lamps from £4 10s. to £4 5s. per annum.

Cambridge Gas Company.—The shareholders of this Company have held their ordinary half-yearly meeting, and have declared dividends at the rates of 10 and 7 per cent. per annum on the various classes of capital. Annexed to the Directors' report was one by the Manager (Mr. O. J. Weeks), which stated that a very large outlay had been incurred in repairing main and service pipes, owing to the damage caused by sewerage operations. The increased amount received for gas had been above the average; but owing to the state of the markets for residuals, the prices obtained for coke, tar, and ammoniacal liquor had been lower than usual. The Chairman (Mr. Dennis Adams) referred with gratification to the growing consumption of gas; mentioning that last half year the increase amounted to upwards of £816. As to the residuals, coke produced about the same price; but the value of tar had fallen very much indeed. Ammoniacal liquor dropped to a greater extent even than tar—the receipts being £254 less. Alluding to the expense to which the Company had been put by the breaking of pipes through the new sewerage works, he said he feared this had not yet come to an end. However, some of the outlay was not an entire loss, because the opening of the drains had exposed gas pipes which were in process of decay; and thus they had had the opportunity of replacing them with new ones. The report was adopted.

The Recent Dismissal of Men by the Leeds Corporation Gas Committee.—A conference of the men engaged in the gas-works, water-works, sanitary, and tramways departments of the Leeds Corporation was held last Sunday week, to consider what steps should be taken in consequence of the dismissal by the Gas Committee of a foreman of the pipe-laying men, and the suspension of another foreman named Heslop. A resolution was unanimously passed strongly protesting against the action of the Committee. The meeting considered the Committee had "not the slightest justification for suspending Heslop." In the other case, they felt that "if an error has been committed, of which there is no absolute proof, dismissal is a grave punishment, considering the excellent character the man bears for good workmanship, and the fact that he has been a servant of the Corporation for 26 years." The resolution further urged "all Corporation employees to stick together, so that, in the event of any dispute occurring between any section of the workmen and the Corporation—if such dispute cannot be settled by conciliatory methods—joint action may be taken." A Special Emergency Committee of Corporation workmen was also formed. Mr. Smith, one of the local officials of the Gas-Workers' Union, states that they have now so many Corporation workmen in the Union that a repetition of the sectional fight of 1889—the gas strike—is a practical impossibility. He believes that the present dispute will be settled amicably.

Growth of the Gas Supply at Barry.—A striking instance of the evolution of a small town is presented by Barry, in Glamorganshire. According to a local paper just to hand, less than ten years ago the population consisted of only a few hundred people; but the opening of the dock in July, 1889, brought life and activity into the place, and now it numbers close upon 30,000. The town has surpassed Newport and Swansea as a coal port; and it possesses many advantages which justify it in bidding high for a first-class passenger Atlantic service with New York—the distance to London from that city being less by 40 miles *viâ* Barry than *viâ* Milford. All this tends to the advantage of the Urban District Council in their capacity of suppliers of gas; and already they have profited by the general improvement. In the past 13 months, they have taken on 500 additional gas consumers, 400 of whom have their supply through prepayment meters. The high appreciation in which gas is held as a heating agent in culinary operations is evidenced by the demand for cooking-stoves; the number fixed having risen in the same period from 170 to about 500. Doubtless much of this augmentation in the business of the Council is due to the energy of their Engineer and Manager (Mr. F. M. Harris), who must be congratulated thereon.

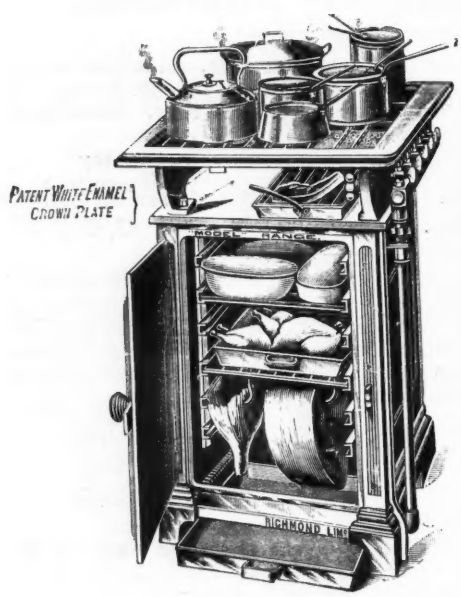
The Saltash Water-Works.—For some time past, works have been in progress for supplying the little Cornish borough of Saltash with water from Plymouth. It was at first proposed that the main should be carried over the Tamar by means of the railway bridge; but afterwards it was decided to lay the pipes in the bed of the river. Difficulties have, however, arisen; and at present the work is at a standstill. At a meeting of the Town Council last Tuesday, the Water Committee reported the receipt of a letter from Mr. John Shaddock, the Contractor for the work of laying the pipes across the river. Mr. Shaddock said the failure experienced was due to the weakness of the flexible joints. Mr. Masterton, the Engineer, ordered the joints, and when they were delivered he stated that they had been examined by him, and stood the required test. Mr. Masterton was also present when the pipes were floated into line; and he ordered them to be lowered. Some of the joints broke in lowering, and were repaired by divers. Then when the test was applied, the flanges, which were not sufficiently strong, broke. Under these circumstances, Mr. Shaddock said he considered his contract at an end, except that he would, when called upon to do so, connect the main under the river with the meter on the Devonshire side, and with the town mains of Saltash on the Cornish side. He asked for payment of a sum of £750 on account. The Water Committee recommended that seven days' notice should be given to Mr. Shaddock to complete his contract, failing which the Corporation would proceed to carry it out; reserving to themselves any right to compensation which they might have. Alderman Adams, the Chairman of the Water Committee, said they had exercised great patience in the matter; and unless strong measures were taken, they would not have any water in the spring. Mr. A. J. Widdicombe thought they ought to hear what the Contractor had to say before proceeding to such extreme measures. He thought experts should be called in to advise the Corporation as to where the responsibility lay; and he moved an amendment to this effect. It was, however, supported by the mover and seconder only; and the recommendation of the Committee was adopted.

RICHMOND & CO., LTD.

WARRINGTON & LONDON.

CELEBRATED "MODEL"

Gas Cooking Ranges.



GREAT IMPROVEMENTS JUST COMPLETED.

All Stoves supplied with Patent White Enamelled Crown-Plate, giving the Cooker a very pleasing appearance.

FITTED WITH REMOVABLE BURNERS, AND CAN BE TAKEN TO PIECES SO READILY.

THE BEST STOVE MADE FOR HIRING OUT PURPOSES.

Prices, £3 7s. to £40.

Teignmouth Gas Supply.—The increasing difficulties of the gas undertaking were again referred to at the meeting of the Teignmouth Urban District Council last Tuesday. From a report presented by the Finance Committee, it appeared that the ascertained liabilities on the gas account amount to £1777, which together with a balance of £342 due to the Treasurer made a total of £2119. Mr. F. Wheatley said that against this sum there must be placed rentals of about £1200. At the same time, he must admit that the liabilities seemed to be increasing. The Gas Committee reported that they had had under consideration several offers to inspect the gas-works and mains, and report upon their conditions and requirements; and they recommended that Mr. G. Livesey's terms be accepted, and that he be appointed to visit the works and report. This recommendation was adopted, as was also another requiring the owners of private meters of earlier date than 1890 to have them tested. The Surveyor had reported to the Committee that six years was considered a very fair time for gas-meters to be in use; after that time they should be examined and adjusted.

The Torrington Corporation and the Water-Works.—A further stage in the negotiations between the Torrington Corporation and the Water Company for the purchase of their undertaking was reached last week. On the recommendation of Mr. Baldwin Latham, the Corporation offered £5441 for the undertaking; while the Company asked £6620. There was thus a difference between the two valuations of £1179. As the result of further negotiations, the Company agreed to reduce the price by half this difference; and, on Mr. Latham's advice being sought, they suggested that this offer should be accepted, as in all probability, it would enable the Council to get their Bill through Parliament without opposition. This would mean a saving of more than the amount of the difference between his valuation and the sum asked by the Company. Alderman Slee objected to the Council paying more than the original valuation. Mr. Vaughan held that, in the interest of the town, they should purchase the property; and he said that, if they missed the present opportunity, the chance would be lost for ever. Mr. Jackson moved that the offer of the Water Company be accepted, provided that the Company afford every facility for the Council obtaining an Act of Parliament, and that the period of repayment of the loan be sixty years. An amendment that the original offer be adhered to was defeated; as was also a second amendment to take the opinion of the ratepayers before any terms were agreed upon. The resolution was carried with only three dissentients.

Suffocation by Gas in Paris.—The Paris Correspondent of the "Daily Chronicle" says: "Suffocation by escapes of gas have been rather frequent of late here. A sad instance has just occurred. Mdlle. Rose Sitterlet, the maid and companion of Mdlle. Andrée Mégard, the actress of the Palais Royal, returned home with her mistress after the performance. She retired to her room and placed some hot water to boil over a gas-burner. Being fatigued, she fell asleep; and the water boiling over extinguished the gas. In the morning, the unfortunate girl was found lying dead with her hands raised to the window, which she had vainly attempted to reach."

The tender of Messrs. Arnold and Son, of Doncaster, at £23,000, has been accepted by the Leeds Corporation Water Committee for the construction of the Harehills service reservoir.

Messrs. Hanna, Donald, and Wilson, of Paisley, have purchased the drawings, patterns, set blocks, &c., belonging to the estate of Messrs. W. Brodie and Co., gas engineers, of that town.

Messrs. R. Dempster and Sons, Limited, of Elland, have secured the order for four purifiers 30 feet by 20 feet, with 24-inch connections, tower scrubber, and annular condensers, for the Accrington District Gas and Water Board.

During the past month, Messrs. Richmond and Co., Limited, held a series of very successful gas and cookery exhibitions at Willesden and Highgate, under the auspices of The Gaslight and Coke Company. Lectures were delivered by Miss Clara Lennard, of Leicester.

Messrs. Adolphe Crosbie, Limited, of Wolverhampton, have forwarded to us one of their new catalogues of paints, varnishes, oils, and sundries. It is a comprehensive presentment of the firm's manufactures, which are extensively employed in gas and other works. A page containing 32 samples of paints is a very effective display of some of the various tints in which these materials are made.

The Directors of the Brighton and Hove General Gas Company have instructed Mr. Alfred Richards to sell by auction to-morrow week, at the Mart, Tokenhouse Yard, E.C., £10,000 of the Company's "A" ordinary stock, which ranks for a standard dividend of 7 per cent. per annum, subject to the sliding-scale, but the last dividend on which was 8½ per cent. The stock will be put up in lots of £100 each.

GWYNNE & BEALE'S
PATENT GAS EXHAUSTERS AND ENGINES

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 65,095.

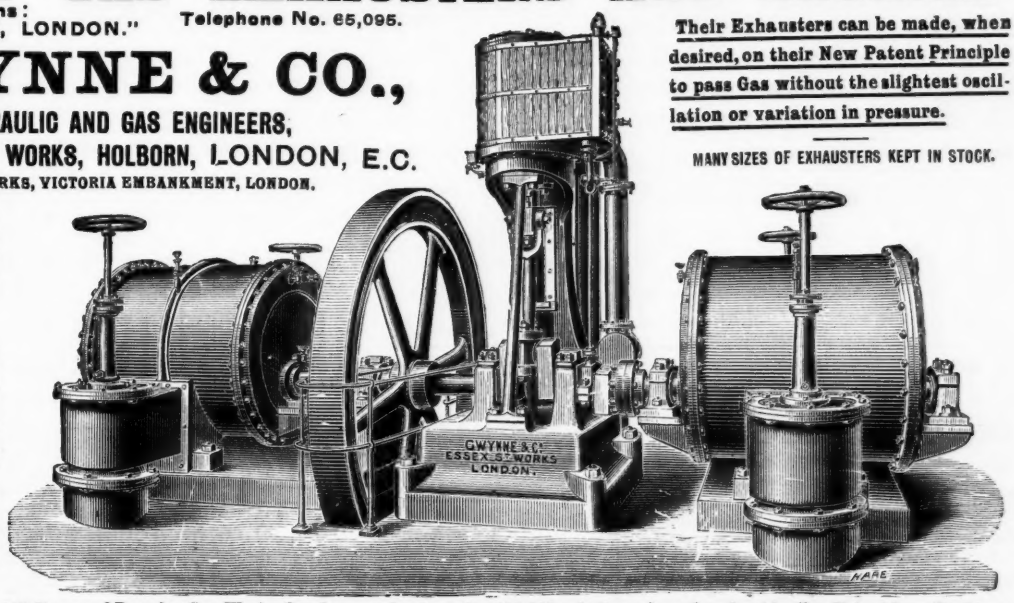
GWYNNE & CO.,
HYDRAULIC AND GAS ENGINEERS,
BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK.



Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.

Catalogues and Testimonials sent on application.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

JOHN WM. O'NEILL, Managing Director, Palmerston Buildings, Old Broad Street, London, E.C.

ANDREW STEPHENSON, AGENT. All communications re Oxide to be addressed to Palmerston Buildings.

WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 300 British Gas-Works.

ANDREW STEPHENSON,
182, GRESHAM HOUSE,
OLD BROAD STREET,
LONDON, E.C.

Telegrams: "Volcanism, London."

J. & J. BRADDOCK, Globe Meter Works, Oldham.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

Telegraphic Address: "Braddock Oldham."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.

Telegraphic Address: "PORTER LINCOLN."

[For Illustrated Advertisement see page 258.]

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality. Sample and Price on application.

OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

OXIDE OF IRON.

FINEST Quality of Natural Bog Ore. Particulars and price, apply to Mr. T. L. ARCHER, 20, Fennel Street, MANCHESTER.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c. CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special Attention to Repairs.

Before placing Orders, please write for Estimate.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

AMMONIACAL LIQUOR wanted.
BROTHERTON AND Co., Ammonia Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

GAS TAR wanted.
BROTHERTON AND Co., Tar Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SPENT OXIDE wanted.
BROTHERTON AND Co., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SULPHURIC ACID for Sale.
BROTHERTON AND Co., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.
Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

WANTED, a Situation as Gas Stoker. Understands Engines and Exhauster, and good Shovel Charger.
State Wages to F. C., 19, Victoria Road, Godalming, SURREY.

WANTED, by a practical Man, a Situation as GAS-FITTER. Used to Gas-Stoves and Slot Meters. Twenty Years' experience with Gas Companies. Abstainer; Married.
Address No. 2790, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

YOUNG Man desires Situation in Gas or Water Office as CLERK or COLLECTOR. Ten Years' general Experience in a large Midland Gas Accountant's Office. Age 25. Good References.
Apply, by letter, to No. 2778, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GENTLEMAN, with knowledge of DRAWING and Experience in TRAVELLING and general routine of Gas Engineer's Office, is open to Engagement. Has good connection with Gas Companies, and no objection to go abroad.
Address No. 2786, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

A RELIABLE trustworthy Man wanted for MAKING GAS and COLLECTING ACCOUNTS.
State Particulars and lowest Wages to No. 2791, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, temporarily, a good Gas-FITTER, used to Iron and Compo., and Jobbing Work. Must not object to make himself generally useful.
Apply, by letter, enclosing *copies* of Testimonials and stating Wages required, to the MANAGER, Gas-Works, Draycott, DERBY.

FOREMAN of Gas-Works required for South America. Must be thoroughly competent in the Manufacture of Coal and Water Gas, in the Yard, and in the Distribution. Salary £300 per annum, with House, &c., and a Bonus on the Working. Voyage Out and Home and reasonable Expenses paid. Three Years' Agreement.
In applying, state Age, and send *copies only* of Testimonials, which will not be returned.
NOTE.—Only applications from those who have had PRACTICAL EXPERIENCE in the MANUFACTURE of WATER GAS will be considered.
Address No. 2789, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CAMBRIDGE UNIVERSITY AND TOWN GASLIGHT COMPANY.

TO GAS MANAGERS.

THE Directors of the above Company are prepared to receive APPLICATIONS for the appointment of MANAGER at their Works.
Applicants must have a thorough knowledge of the Manufacture and Distribution of Gas, the laying and repairing of Mains, Services, &c.
Applications in Candidate's own handwriting, with *copies* of Testimonials (which will not be returned), must be sent to the undersigned, from whom Particulars as to Remuneration, Duties, &c., may be obtained, on or before the 17th of February next.
By order of the Board of Directors,
O. J. WEEKS,
Manager.

SADLER & Co., Ld., Middlesbrough; ULVERSTON (BARROW); PORTSMOUTH; CARLTON (N.E.R.); and STOCKTON. Tar and Petroleum Distillers. Benzol and Petroleum Spirit, 700 and other Gravities specially prepared for Carburetting. SOLAR OIL for Gas Making, Kerosene, &c.
Correspondence invited.
Telegraphic Address: "Sadler, Middlesbrough."

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS.
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

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J. C. CHAPMAN, M.I.M.E. and Fel Chartered Inst. Patent Agents. ADVICE ON ALL MATTERS CONNECTED WITH ABOVE.
Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

ECONOMY IN PURIFICATION.

INCREASE the Efficiency of your PURIFIERS by adopting CRIPPS'S PATENT BYE-PASS VALVE in the lower Tiers of Sieves. Practical Experience proves their Economy. Engineers are repeating orders after thorough trial.
References and Particulars can be obtained from the Makers—
C. & W. WALKER, Midland Iron-Works, Donnington, near Newport, SALOP.
And J. EVERY & SON, Phœnix Iron-Works, LEWES.

EXHIBITION OF GAS APPLIANCES.

THE New Mills Urban District Council intend shortly to hold AN EXHIBITION OF GAS APPLIANCES, in the Town Hall, New Mills.
Full Information can be obtained on application to Mr. E. Jones, Gas Offices, New Mills.
Manufacturers and others desirous of exhibiting, to state Conditions, Terms, and Space required for Exhibition, the same to be sent in not later than Feb. 17, 1897, to the undersigned.
JOSEPH POLLITT,
Clerk to the Council.
New Mills, Jan. 30, 1897.

MERTHYR TYDFIL GAS COMPANY.

WANTED, immediately, Two Wrought-IRON-PIPE FITTERS for Interior Work. Only experienced and skilful Workmen of good character and sober habits need apply. Wages, 30s. per week.
JOHN L. COCKER,
Secretary and General Manager.
Gas Offices, Gas-Works,
Merthyr Tydfil, Glamorganshire,
Jan. 28, 1897.

WANTED, to purchase Gas Carbon delivered at nearest Station to Gas-Works, in quantities of not less than 4 tons.
Address, stating Price per ton and quantity, No. 2772, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS-METER MANUFACTURERS.

WANTED, Gas-Meter Makers to supply METERS, Wet and Dry, 3-Light, in quantities, and fix thereon ready-made PATENT ATTACHMENTS of simple mechanism. Large and regular orders waiting. Arrangements can be made to mutual advantage.
Apply, by letter, to No. 2788, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS TAR and Ammoniacal Liquor Wanted.
Apply to JOSIAH HARDMAN, Milton, STAFFS.

OFFERS wanted for fifty "A" £5 Shares in the Hoylake and West Kirby Gas and Water Company. Dividends thereon for 1896, £26 10s.
Address S 34, care of C. Birchall, 7, Victoria Street, LIVERPOOL.

FOR SALE, Second-hand—A Station GOVERNOR, 6-inch Connections, and Bye-Pass. Makers, Messrs. Laidlaw (1876). In good order when last working (July, 1896).
Apply to the GAS MANAGER, MILLOM.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also COMPLETE WORKS equal to 7000, 20,000, 60,000 cubic feet per diem. **Inquire and compare Prices and Particulars before ordering elsewhere.**
J. F. BLAKELEY, Gas Engineer, Ravensthorpe, YORKS.

COAL GAS PLANT FOR SALE.

THE whole of the costly Plant, now in excellent working order, including two large Gasholders, and all the expensive Fittings throughout a well-known Mansion and Premises about 20 miles from London, TO BE SOLD at a Sacrifice, the owner having no further use for the same. Any reasonable offer will be submitted.
Apply for further information to HAMPTON AND SONS, 1, Cockspur Street, PALL MALL, S.W.

CANNEL, COAL, ETC.

JOHN ROMANS & SON, EDINBURGH, Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / NEWTON GRANGE, NEWBATTLE, DALKEITH, } SCOTLAND.

SULPHATE OF AMMONIA SATURATORS.

WALTER THOMASON and SONS, Chemical Plumbers, &c., and Makers of Lead Saturators, &c., 21, WESTON STREET, BOLTON. Repairs of every description.
Please write for Estimate before ordering elsewhere.

GAS, Water, and Electric Lighting, The LAW OF. By MICHAEL and WILL. Fourth Edition. Re-written and brought down to September, 1894, by J. SHIRESS WILL, Q.C., Esq. *Royal 8vo. Price 32s., Cloth; for Cash, Post Free, 26s. 6d.*
"Pains have been taken to treat more fully many subjects of constantly recurring importance to those concerned—such as the Law relating to the Breaking-up of Streets, and the Maintenance therein of the various Appliances connected with the Water Supply, &c."—*Extract from Preface.*
BUTTERWORTH AND Co., 7, FLEET STREET, E.C.

FOR SALE, cheap—
One Two-Lift GASHOLDER and CAST-IRON TANK, 64 ft. by 16 ft.; Capacity, 98,000 cubic feet.
One CAST-IRON TANK, 65 ft. by 16 ft.; Capacity, 331,800 gallons.
One TWO-LIFT GASHOLDER, 50 ft. by 16 ft. Capacity, 63,000 cubic feet.
One CAST-IRON SCRUBBER, 38 ft. 6 in. by 6 ft. diameter.
Two PURIFIERS, 8 feet square, complete, with 8-inch bye-pass Valves and Connections.
EXHAUSTERS, 5000 to 60,000 cubic feet per hour.
We would undertake to re-erect any of the above, if desired.
Photos, Particulars, and Prices of above on application to SAML. WHILE AND SONS, 60, Queen Victoria Street, LONDON, E.C.

TENDERS FOR GAS COAL.

THE Directors of the Cork Gas Con-sumers' Company invite TENDERS for best GAS COAL in such quantities as they may require for One, Two, or Three Years. Deliveries to commence in April next.
Quotations to state Prices f.o.b. and c.i.f.
J. S. O'MAHONY,
Secretary.
72, South Mall, Cork.

SHEPTON MALLET GAS AND COKE COMPANY.

THE Directors are prepared to receive TENDERS for the erection of a GASHOLDER of the capacity of about 33,000 feet, and also for the Excavation for, and Building a Tank for same. Estimates may be given for both Holder and Tank, or for Tank separate from Holder.
Plans and Specifications may be seen at the Offices of the Company, on application to the Superintendent; and Estimates must be sent in before Feb. 8.
The Directors do not pledge themselves to accept the lowest or any tender.
WM. CLARKE, Superintendent.
Jan. 18, 1897.

CORPORATION OF LEICESTER.

RETORT-FITTINGS, HYDRAULIC MAIN, &c.
SECTION No. 2—CONTRACT No. 36.

THE Gas and Electric Lighting Com-mittee are prepared to receive TENDERS for the supply of RETORT-FITTINGS, HYDRAULIC MAIN, &c., at their Aylestone Road Works.
Drawings may be seen, and Specification and Form of Tender obtained, upon application to the Engineer, and on payment of the sum of £5, which amount will be returned upon receipt of a *bond-fide* tender.
Tenders, addressed to Alderman Lennard, Chairman, and endorsed "Tender for Retort-Fittings, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Saturday, Feb. 6, 1897.
The Committee do not bind themselves to accept the lowest or any tender.
ALFRED COLSON, M.Inst.C.E.,
Engineer and Manager.
Offices: Millstone Lane,
Leicester, Jan. 23, 1897.

CORPORATION OF LEICESTER.

RETORTS AND FIRE-BRICKS.
SECTION No. 2—CONTRACT No. 38.

THE Gas and Electric Lighting Com-mittee of the above Corporation are prepared to receive TENDERS for the supply and delivery of RETORTS and FIRE-BRICKS.
Specification, Quantities, and Form of Tender can be obtained from the Engineer.
Tenders, addressed to Alderman Lennard, Chairman, and endorsed "Tender for Retorts, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Saturday, Feb. 6, 1897.
The Committee do not bind themselves to accept the lowest or any tender.
ALFRED COLSON, M.Inst.C.E.,
Engineer and Manager.
Offices: Millstone Lane,
Leicester, Jan. 23, 1897.

TENDERS are invited for Lighting the City of S. PAULO (BRAZIL) BY GAS, and must be sent under sealed covers, marked "Illuminaçao a Gaz da Cidade de S. Paulo," to the Secretaria da Agricultura, Commercio, e Obras Publicas (Department of Agriculture, Commerce, and Public Works), in time to reach the said Department not later than Three o'clock p.m., on April 30, 1897.

Particulars may be had on application, by letter, to the BRAZILIAN LEGATION, LONDON; or to the BRAZILIAN CONSULATES in LONDON, LIVERPOOL, or GLASGOW.

TO GAS COMPANIES, &c.

SPENT OXIDE.

THE Sheffield United Gaslight Company are open to contract for the purchase of SPENT OXIDE for delivery over Twelve Months.

Parties offering must state Quantity and Price per Unit, free on Rail.

HANBURY THOMAS,
General Manager and Secretary.

Commercial Street, Sheffield,
Jan. 28, 1897.

BOROUGH OF HEYWOOD.

THE Gas Committee invite Tenders for the supply of about 10,000 Tons of COAL (Screened, Unscreened, Nuts, or Cobbles) and 500 Tons of CANNEL.

Specification and Form of Tender may be obtained on application to Mr. W. Whatmough, Gas Manager.

Sealed tenders, marked "Coal," to be sent to me not later than Tuesday, Feb. 16, 1897.

By order,
J. H. BALDWICK,
Town Clerk.

Municipal Buildings, Heywood,
Jan. 28, 1897.

EDINBURGH AND LEITH CORPORATIONS GAS COMMISSIONERS.

TO ENGINEERS AND CONTRACTORS.

THE Commissioners invite Tenders for the supply and erection of STEEL WATER and TAR TANKS at their New Street Works.

Specifications, Forms of Tender, and all Particulars may be obtained from the Engineer at these Works.

Sealed tenders, endorsed "Tenders for Tanks," must be lodged with the undersigned by Ten a.m.on Saturday, the 6th of February.

The Commissioners do not bind themselves to accept the lowest or any offer.

JAMES M'G. JACK,
Clerk.

25, Waterloo Place, Edinburgh,
Jan. 23, 1897.

SOUTH METROPOLITAN GAS COMPANY.

NOTICE is Hereby Given, that an EXTRAORDINARY MEETING of the Proprietors of the South Metropolitan Gas Company will be held at the Bridge House Hotel, London Bridge, in the Borough of Southwark, on Wednesday, the 17th day of February next, at half-past Two o'clock in the afternoon, or so soon thereafter as the business of the Ordinary General Meeting shall have been concluded, for the purpose of CONSIDERING THE PROVISIONS OF THE BILL now before Parliament, intituled "A Bill to Alter the Qualification for Directors of the South Metropolitan Gas Company."

At such Meeting the said Bill will be submitted for the consideration and approval of the Proprietors.

Dated this 30th day of January, 1897.

FRANK BUSH,
Secretary of the Company.

Offices: 709A, Old Kent Road, S.E.

THE TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the Directors of the above Company intend to OFFER FOR SALE by PUBLIC AUCTION, at the Mart, Tokenhouse Yard, in the City of London, on Tuesday, the 9th day of March next, at Two o'clock in the afternoon precisely, £15,000 (being fourth portion) of "C" STOCK, in the following Lots: 100 of £100 each, and 100 of £50 each, issued under the Powers of the Tottenham and Edmonton Gas Act, 1882.

By order,
JAMES RANDALL,
Secretary.

Dated this 29th day of January, 1897.

CRYSTAL PALACE DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Albion Tavern, Aldersgate Street, London, E.C., on Friday, the 19th day of February, 1897, at Three o'clock precisely, to receive the Report of the Directors and Statement of Accounts for the Half Year ended the 31st of December last, to declare a Dividend, to elect two Directors and one Auditor retiring by rotation, and for General Purposes.

The TRANSFER BOOKS WILL BE CLOSED from the 5th day of February until after the Meeting.

By order of the Board,
CHARLES M. OHREN,
Secretary.

Offices and Works: Lower Sydenham, S.E.,
Feb. 1, 1897.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

SALE OF DEBENTURE STOCK.

THE Directors have instructed Mr. ROBERT MACK, Auctioneer, to SELL BY AUCTION, at the Offices of the Company, Grainger Street West, Newcastle-upon-Tyne, on Wednesday, the 24th day of February, 1897, at Half-past Twelve o'clock precisely, £45,000 of the NEWCASTLE-UPON-TYNE AND GATESHEAD GAS DEBENTURE STOCK, bearing Interest at 3½ per cent. per annum, payable Half Yearly on the 1st of January and the 1st of July, being part of the moneys authorized to be raised by the Newcastle-upon-Tyne and Gateshead Gas Act, 1896.

For Conditions of Sale and further Particulars, apply to the undersigned.

THOS. WADDOM,
Secretary.

Gas Office, Newcastle-upon-Tyne,
Jan. 26, 1897.

CHELSEA WATER-WORKS COMPANY.

2¾ PER CENT. DEBENTURE STOCK.

MINIMUM PRICE: £98 PER CENT.

ISSUE OF AN AMOUNT TO REALIZE £50,000.

NOTICE is Hereby Given, that the Directors are prepared to receive TENDERS for the above ISSUE, being the whole of the amount created and authorized under the Chelsea Water-Works Act, 1896, bearing Interest at 2¾ per cent. per annum, and Redeemable after the expiration of 25 Years from the date of issue, subject to Six Months' Notice being given by the Company.

Minimum Price: £98 per cent.

Tenders must be delivered at the Company's Office, No. 41, Commercial Road, Pimlico, S.W., not later than Eleven a.m., on Thursday, the 25th of February next.

Particulars and Conditions of Sale, together with Forms of Tender, may be obtained at the said Office, or will be forwarded on application.

By order of the Court of Directors,
G. H. GILL,
Secretary.

41, Commercial Road, Pimlico,
Jan. 14, 1897.

PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·4 candles.
Coke	68 per cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

THE WALLSEND & HEBBURN COAL COMPANY, LTD.
8 Lombard Street,
NEWCASTLE-ON-TYNE.

W. RICHARDSON, Fitter.

ISSUE OF STOCKS AND SHARES BY AUCTION UNDER PARLIAMENTARY POWERS.

MR. ALFRED RICHARDS undertakes the issuing by Auction of GAS AND WATER SHARES under Parliamentary Powers.

He also holds MONTHLY SALES of GAS AND WATER SHARES at the Auction Mart, Tokenhouse Yard, E.C.

Terms for the issuing of Capital, and also for offering to auction Gas and Water Shares, and all Particulars relating thereto, may be had of Mr. Alfred Richards.

Offices: 18, FINSBURY CIRCUS, E.C.

By Order of the Directors.

IMPORTANT ISSUE OF £10,000 STOCK OF THE BRIGHTON AND HOVE GENERAL GAS COMPANY.

MR. ALFRED RICHARDS will Sell by AUCTION, at the Mart, E.C., on Wednesday Feb. 10, at Two precisely, in lots of £100 each,

£10,000 OF "A" ORDINARY STOCK
OF THE
BRIGHTON AND HOVE GENERAL GAS COMPANY,

ranking for a Standard Dividend of 7 per cent., subject to the Sliding Scale; the last Dividend on the Company's "A" Stock having been 8½ per cent. per annum.

Particulars of the SECRETARY of the Company, at No. 5, GREAT WINCHESTER STREET, E.C., and 77, West Street, BRIGHTON; of Messrs. HOWLETT AND CLARKE, of 8, Ship Street, BRIGHTON, Solicitors to the Company; of Mr. RALPH HOMAN, Stock and Share Broker, 2, Austin Friars, LONDON, E.C.; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

(INCORPORATED BY ACT OF PARLIAMENT, 1859.)

SALE OF £15,000 STOCK.

MR. ALFRED RICHARDS is instructed to SELL BY AUCTION at the Mart, Tokenhouse Yard, E.C., on Tuesday, the 9th of March, 1897, at Two o'clock, in Lots of £100 and £50 each,

£15,000 OF "C" STOCK,

ranking for a Standard Dividend of 7 per cent., subject to the Sliding-Scale (the last Dividend on similar Stock having been at the rate of 8¼ per cent.), and issued pursuant to the Company's Act of 1882.

Particulars may be obtained at the COMPANY'S OFFICES, Willoughby Lane, TOTTENHAM; of Messrs. MERRIMAN, PIKE, and MERRIMAN, Solicitors, 25, Austin Friars, E.C.; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C., and 816, High Road, TOTTENHAM.

ARMSTRONG'S
PATENT
CANDLE SAFETY LAMPS.

Are a great improvement on Oil, giving a good Light, requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

43, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

JAMES OAKES & Co.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

WASHER-SCRUBBERS.

NOTICE.

I, H. KIRKHAM, wish to apprise all Gas Companies that I have used the word "Standard" in my Circular NOT KNOWING that it was a REGISTERED TRADE MARK, and now beg to apologize and withdraw it from my Circular.

Particulars of my Patent Cage and Purifying Surfaces will be advertised and illustrated in the "Journal" at an early period, when I shall be prepared to Tender for Washer-Scrubbers with such Patent Devices.

H. KIRKHAM.

335, Mansion House Chambers, London, E.C.

PUBLICATIONS

ISSUED BY

WALTER KING,

11, BOLT COURT, FLEET STREET, LONDON, E.C.

ALL PARCELS SENT CARRIAGE FREE.

Now Ready, Price 5s. 6d., Post Free.

— FOURTEENTH YEAR —

THE

COMPLETE REPORTS

OF PROCEEDINGS OF THE

ASSOCIATIONS

OF

GAS ENGINEERS & MANAGERS

OF THE UNITED KINGDOM

FOR 1896.

The Thirteen previous Volumes (1883-95) are still on sale, Price 3s. each, Post free.

Price 7s. 6d., Demy 4to., Limp Cloth.

THE FLOW OF GASES

AND

PROPORTIONING GAS-MAINS.

FOUR DIAGRAMS

(with Explanatory Pamphlet),

Invented by

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THE GUIDE-FRAMING OF GASHOLDERS AND OTHER PAPERS, CHIEFLY RELATING TO STRAINS IN STRUCTURES CONNECTED WITH GAS-WORKS. — By F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E. Bevelled cloth. Price 6/-.

GASHOLDERS WITH OR WITHOUT GUIDE-FRAMING.—A Discussion between E. Lloyd Pease and F. Southwell Cripps. To which is added a Synopsis of all the Literature (English and Foreign) on Reducing or Abolishing the Guide-Framing of Gasholders, also the principal Literature on Gasholder Construction generally, compiled to March, 1893; with a List of all the English and Foreign Periodicals connected with the Gas Industry.— By F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E. In Paper Covers. Price 1/-.

THE CHEMISTRY OF ILLUMINATING GAS. —By NORTON H. HUMPHRYS, Assoc.M.Inst.C.E., F.C.S. Price, bound in cloth, 6/-.

THE VALUATION OF GAS-WORKS FOR ASSESSMENT. — By THOMAS NEWBIGGING, M.Inst.C.E. Price 3/6 (76 pages, demy 8vo., limp cloth).

THE SCIENCE AND PRACTICE OF LIGHTING as applied to Streets, Open Spaces, and Interiors. — By W. H. Y. WEBBER. Price 3/6 (Demy 8vo. cloth).

TABLES OF VALUES, DISCOUNTS, DIVIDENDS, AND WEIGHTS AND MEASURES, FOR USE IN GAS OFFICES.—Arranged by THOMAS NEWBIGGING, M.Inst.C.E. Price 2/-.

ANALYSES OF SCOTCH COALS, CANNEL, SPLINT, SHALE, &c., USED IN THE MANUFACTURE OF GAS.—By (the late) Dr. WILLIAM WALLACE, of Glasgow. Price, in stiff cover, fcap. folio, oblong, 1/-.

ANALYSIS OF THE ACCOUNTS OF THE METROPOLITAN WATER COMPANIES.— Issued Annually, as compiled and arranged by ALFRED LASS, F.C.A. Sixteenth year, 1895-96, price 15/-. Previous Volumes still on sale.

THE COMPOSITION AND USE OF GAS LIME IN AGRICULTURE.—By (the late) Dr. A. VOELCKER, Professor of Chemistry to the Royal Agricultural Society of England. A 4-pp. leaflet for distribution among farmers and others. Price 5/- per 100.

CONSPIRACY AND PROTECTION OF PROPERTY ACT.—It is required, under a Penalty of FIVE POUNDS, that a printed Copy of the 4th Section of this Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat. Printed copies of this section, in large type, on broad sheets, price 2/- per dozen, or 10/6 per 100. The Act extends to Scotland and Ireland.

ORDERS FOR OTHER TECHNICAL PUBLICATIONS WILL BE EXECUTED AT PUBLISHERS' PRICES.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED,

— *v* —

"DE MARE" COMPANY.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED.

— *v.* —

"SUNLIGHT" COMPANY.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED, HEREBY GIVE NOTICE, as follows:—

VALIDITY. The Company's Patent has been declared **VALID ON ALL POINTS** after a Fifteen-Day Trial.

NATURE OF INVENTION. The Invention was described by Mr. Justice Wills as a **"PIONEER INVENTION."**

SCOPE OF PATENT. The Patent **HAS BEEN GIVEN A WIDE CONSTRUCTION**; and it was held that the protection given by it was not confined to Mantles manufactured according to the particular prescriptions set out in the Specification.

SHAPE OF MANTLE. The Judge held that a Mantle, even if made in a different form or shape (such as the "De Mare" Fringe or Plume), **IS STILL AN INFRINGEMENT** of the "Welsbach" Patent.

"DE MARE" JUDGMENT. Judgment for an **INJUNCTION, WITH FULL COSTS**, has been given against the "De Mare" Incandescent Gas-Light System.

"SUNLIGHT" JUDGMENT. Judgment was given **AGAINST** the "Sunlight" Incandescent Gas-Lamp Company, Limited, on the question of the **VALIDITY OF THE PLAINTIFFS' PATENT.**

"SUNLIGHT" MANTLES. Last about **100** hours.

"WELSBACH" MANTLES. Last about **1000** hours.

"Sunlight" Mantles **BURN DOUBLE THE GAS** to produce the same candle power as the Incandescent Gas-Light Company's Mantles.

Users of "Sunlight" Mantles are applying to the Incandescent Gas-Light Company to **REPLACE THEM BY THEIR OWN MANTLES.**

WARNING. Users of the Incandescent Gas-Light Company's Mantles upon "Sunlight" Burners **ARE INFRINGERS OF THE COMPANY'S PATENT, AND WILL BE AT ONCE PROCEEDED AGAINST.**

COSTS. Certificates of the Validity of the Company's Patent have been granted both by Mr. Justice Romer and Mr. Justice Wills entitling the Company to Solicitor and Client Costs, which will, **IN ALL CASES, BE RIGOROUSLY ENFORCED.**

INFRINGERS. The Incandescent Gas-Light Company **WILL TAKE PROCEEDINGS AGAINST ALL PERSONS INFRINGING THEIR PATENT WHETHER**

MAKERS,
WHOLESALE DEALERS,
RETAILERS,
or
USERS.

Users of the Company's Mantles upon Burners not sold by the Company **ARE INFRINGERS.**

"LIMITED LICENSE" WARNING. Judgments have already been obtained against such users from Mr. Justice Chitty, Mr. Justice Stirling, Mr. Justice Kekewich, and Mr. Justice North.

FAITHFULL & OWEN,
11, Victoria Street,
Westminster.

Solicitors to the Incandescent Gas-Light Company, Limited.

April, 1896.

HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation.

Yield of Gas Per Ton . . 11,205 Cubic Feet.
Illuminating Power, $16\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality) $13\frac{3}{4}$ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton . . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . $13\frac{1}{2}$ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar. . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor $94\frac{1}{2}$ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COALFIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE AND SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

TROTTER, HAINES, & CORBETT,

Brettell's Estate

FIRE-CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of

BEST GLASSHOUSE POT & CRUCIBLE CLAY.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 34, OLD BROAD ST., E.C.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.

RAVENSTHORPE, NEAR DEWSBURY.

THOMAS TURTON

AND SONS, LIMITED,

SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY

FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

LONDON OFFICE:

90, CANNON STREET, E.C.

Lanemark Coal Co.,

LIMITED.

LANEMARK CANNEL

AND GAS COALS.

Quotations and Analysis on Application to

LANEMARK COLLIERY,

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Shipping Ports: All the principal Scotch Ports.

EVESON FOR CANNEL

TELEGRAMS:

"EVESON, BIRMINGHAM."

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON & COAL Co., Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by

Messrs. J. & H. S. PATTINSON, *May 28, 1895.*

Yield of Gas per Ton . .	10,500 Cub. Ft.
Illuminating Power . .	16·9 Candles.
Coke (of good quality) . .	67·5 per Cent.
Sulphur	0·58 ,,
Ash	2·73 ,,

For Price, &c., apply to the

WEARDALE IRON & COAL Co., Ld.

QUAYSIDE, NEWCASTLE-ON-TYNE.

BOLDON GAS COALS.

Worked by THE HARTON COAL CO., LTD.

Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton . .	**10,500**	**Cubic Feet.**
Illuminating Power . .	**16·9**	**Candles.**
Coke	**66·7**	**Coke.**
Sulphur	**0·86**	**Sulphur.**
Ash	**2·04**	**Ash.**

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Danish Gas Company, Bombay Gas Company, San Paulo Gas Company, Alliance and Dublin Consumers' Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For Prices, &c., apply to the

HARTON COAL COMPANY,

LIMITED,

Newcastle-on-Tyne.

W. H. PARKINSON, FITTER.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,

LIMITED,

NEWBATTLE COLLIERIES,

DALKEITH, N.B.

LONDONDERRY GAS COALS

FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,

COUNTY OF DURHAM.

Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,

SEAHAM HARBOUR, COUNTY OF DURHAM.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE

BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	17·8 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,

COAL OWNERS, NEWCASTLE-ON-TYNE;

OR

E. FOSTER & CO.,

21, JOHN STREET, ADELPHI, LONDON, W.C.

No more NAPHTHALENE in Gas-Mains.

SUPER-CANNELINE

Is specially manufactured as an **Enricher of Coal Gas,** which, when used in Effective Vaporizers, will increase the Illuminating Power of Gas **at a Cost of ½d. per Candle,** as well as keep the Mains free from Naphthalene.

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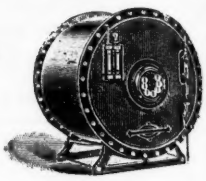

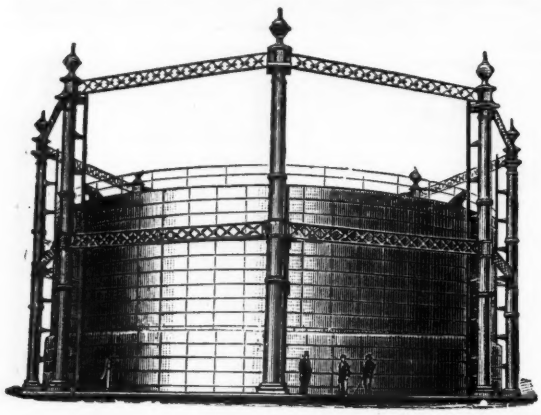

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GAS ENGINEERS,

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Telegraphic Address: "PORTER LINCOLN." National Telephone, No. 13.

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References to 600 Works already erected.

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IN CAST-IRON AND TIN CASES OF THE HIGHEST EXCELLENCE.

ORIGINAL MANUFACTURERS OF DRY METERS IN CAST-IRON CASES.

STATION METERS, EXPERIMENTAL METERS, PHOTOMETERS, & PRESSURE-GAUGES, &c.

Results of Tests of Dry Gas-Meters (Section III.) of the Glasgow Philosophical Society's Gas Exhibition, as per London "Gas Journal," May 10, 1881.

	ALDER & MACKAY.	W. & B. COWAN.	G. GLOVER & Co.	JAMES KEITH.	D. B. PEEBLES & Co.
Total of Fast Tests . .	47·2 ..	6·9 ..	33·6 ..	62·3 ..	53·7
Total of Slow Tests . .	25·3 ..	117·4 ..	43·1 ..	31·4 ..	38·5
	72·5 ..	124·3 ..	76·7 ..	93·7 ..	92·2

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Manufacture & supply best quality of

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Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.

FIRE BRICKS, LUMPS, & TILES, BLUE STAFFORDSHIRE VITRIFIED BRICKS FOR PAVING, &c. &c.

EVERY REQUISITE FOR GAS-WORKS. Retort Setters sent to any part of the Kingdom.

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SIMPLE IN ACTION. POSITIVE IN RESULTS.

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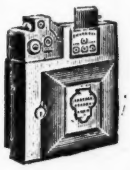

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THE Automatic Gas Meter 1895 Corporation Limited,
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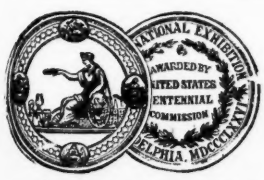

PHILADELPHIA EXHIBITION, 1876.

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The Highest Award for Gas-Retorts and other Goods in Fire-Clay has been awarded to KING BROTHERS for their Goods made from their renowned Stourbridge Fire-Clay.

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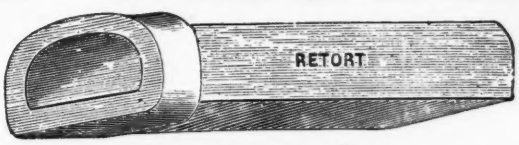

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STOURBRIDGE CLAYS,

Manufacturers of

Fire-Bricks, Tank Blocks, Glass-House Bricks and Pots, Gas-Retorts, Crucibles in Clay and Plumbago, Gas-Oven Bricks, Bricks for Regenerator Furnaces and Hot-Air Stoves.

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CRUCIBLE MANUFACTORY, 46, PENN STREET, CURZON STREET, BIRMINGHAM.

N.B.—Gas, Blast-Furnace, and Glass-House Bricks and Glass-House Pots always in Stock, or made on the Shortest Notice.

COLUMNLESS HOLDERS.

Notwithstanding the antagonistic influence of firms who are not permitted to construct Holders on **GADD & MASON'S PATENT SPIRAL GUIDE SYSTEM,** their adoption grows larger every year. Intelligent Gas Engineers appreciate the **GREATER SAFETY** of these Holders, and the very great **SAVING IN COST** of from **20** to **30 PER CENT.** No first-class Engineer should now think of paying for so much Metal in the shape of Columns, and the Labour of Erection.

A few months ago the "JOURNAL OF GAS LIGHTING" referred to

"THE KNELL OF GASHOLDER GUIDE-FRAMING,"

which speaks volumes.

In order to meet the ever-increasing demand, we have granted **Licenses for the construction of our patent System of Holders, to a select few of the leading Gasholder Makers,** from whom Estimates and Particulars can be obtained.

Gas Engineers are enjoined to avoid Firms who talk twaddle about Columns giving greater strength, merely in order to obtain an Extra Price for the weight of Metal therein and the Labour in Erection. Prices of Materials and Labour are constantly advancing—a sufficient reason why all Engineers should place their orders with Firms who can give them our Holders, and so save considerably in first cost, as well as Repairs, besides getting a **STRONGER, SAFER,** and a **BETTER SYSTEM.**

The first Gadd and Mason Holder was erected some Eight Years ago at Northwich. It has withstood the most violent Storms (one of which brought down the chimney stack), and we believe up to now has not cost a single fraction for Repairs.

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German Licensee:
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THE PATENT GASHOLDER SYNDICATE, 504, Stockport Rd., MANCHESTER.

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MANUFACTURERS OF

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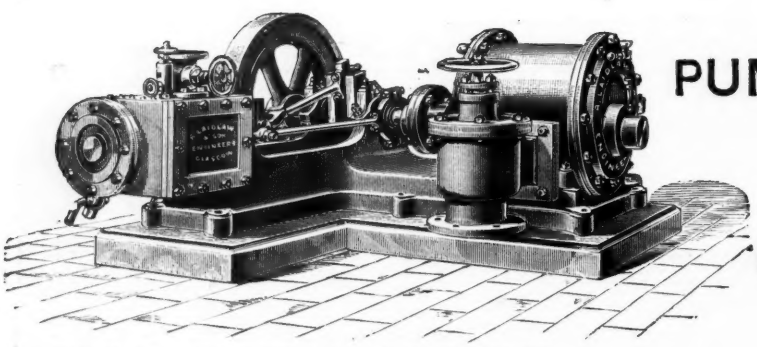
AND
PUMPING-ENGINES.



BEALE'S GAS EXHAUSTER AND ENGINE COMBINED. ALL SIZES.

ALL KINDS OF
GAS AND WATER APPARATUS.

ALLIANCE FOUNDRY, **GLASGOW.** | SIMON SQUARE WORKS, **EDINBURGH.** | 6, LITTLE BUSH LANE, **LONDON, E.C.**

THE NEW INCANDESCENT (SUNLIGHT PATENT) GAS LIGHTING COMPANY, LIMITED.

THE SUNLIGHT COMPANY having finally beaten the Welsbach Company in the Law Courts, notwithstanding the misleading statements which are being advertised, the Legal Position of its Mantle is now

ESTABLISHED BEYOND ALL QUESTION.

Mr. JUSTICE WILLS says in his Judgment: "No use is made by the Defendants (the Sunlight Company) of any of the rare earths; and their choice of substances, and their method of applying the illuminants, appear to me to be as wide asunder as the poles from those contemplated by Welsbach."

Therefore any interference with our Customers by the Incandescent Company in the use of our Mantles, either on our Burners *or on theirs*, should be promptly reported. **It will at once be summarily dealt with by us, without cost to our Customers.**

THE SUNLIGHT MANTLE gives a

SOFT *MELLOW LIGHT*, VERY

AGREEABLE TO THE EYESIGHT, AND HEIGHTENS THE

DECORATIVE EFFECT OF PLEASANT COLOURS.

WE ARE PREPARED TO *MAINTAIN ALL BURNERS* FITTED BY OURSELVES AT A VERY LOW PRICE PER ANNUM;

AND *SPECIAL TERMS* FOR *RENEWAL MANTLES* WILL ALSO BE MADE TO THOSE WHO PREFER TO DO SO THEMSELVES.

THE NEW INCANDESCENT (SUNLIGHT PATENT) GAS LIGHTING COMPANY, LIMITED,

33 & 34, SHOE LANE, LONDON, E.C.

ARROL-FOULIS

PATENT AUTOMATIC MACHINERY

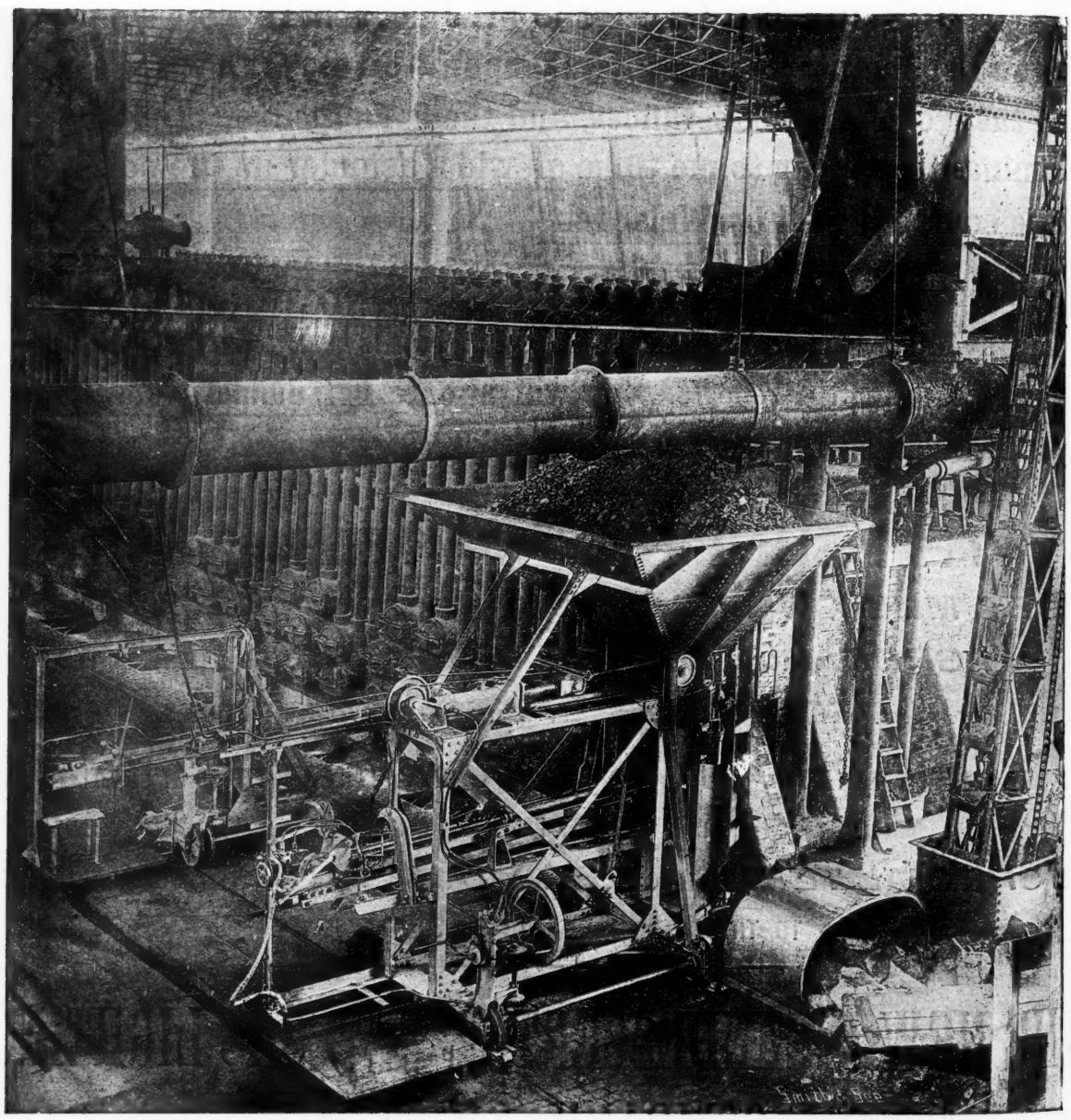
FOR

CHARGING AND DRAWING GAS-RETORTS

SIR WILLIAM ARROL & CO., Ltd., Sole Makers,

GLASGOW.

Plans and Estimates furnished on application.



The above engraving shows the interior of a Retort-House at the Tradeston Gas-Works, Glasgow, where the Machines have been at work since the beginning of 1893, drawing and charging **960 Retorts every 24 hours. 106 Drawing-Machines and 76 Charging-Machines are at work, or in course of construction.**

ALEX. C. HUMPHREYS, M.Inst.C.E. A. G. GLASGOW, M.E.

MESSRS. HUMPHREYS & GLASGOW

Have constructed their EUROPEAN type of

CARBURETTED WATER-GAS PLANT

At the following Gas-Works:—

Copenhagen	700,000 Cub. Ft.	Preston	1,500,000 Cub. Ft.
Belfast	1,700,000 ,,	Southport	750,000 ,,
Belfast (Second Contract)	4,500,000 ,,	Bath	1,000,000 ,,
Glasgow	300,000 ,,	New York	1,200,000 ,,
Brussels	700,000 ,,	Newburgh, N.Y.	350,000 ,,
Brussels (Second Contract)	700,000 ,,	St. Joseph, Mo.	750,000 ,,
Liverpool	3,500,000 ,,	Winchester	200,000 ,,
Tottenham	750,000 ,,	Hoylake	125,000 ,,
Tottenham (Second Contract)	750,000 ,,	Shanghai	225,000 ,,
Santiago	400,000 ,,	Holyoke, Mass.	600,000 ,,
Swansea	750,000 ,,	Stockport	500,000 ,,
Brighton	1,500,000 ,,		

And have now under Contract:—

Manchester	3,000,000 Cub. Ft.	Bordentown, N.J.	125,000 Cub. Ft.
Edinburgh	2,000,000 ,,	Lea Bridge	350,000 ,,
Stockton-on-Tees	500,000 ,,	Newburgh, N.Y. (Second Contract)	250,000 ,,
Norwich	1,000,000 ,,	Coventry	600,000 ,,
Guildford	350,000 ,,	Brentford	1,100,000 ,,
Syracuse, N.Y.	850,000 ,,		

In addition to which the previous Installations of The Gaslight and Coke Company under this System have a total capacity of 10,000,000 cubic feet per diem.

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[ESTABLISHED 1844.] ORIGINAL MAKERS. [ESTABLISHED 1844.]

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The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.

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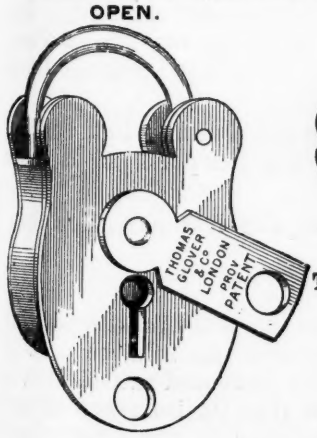

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SECURE PADLOCK

Prevents Tampering with the

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The Padlock is Sealed by means of a Lead Eyelet, which is impressed with Company's private mark.
Eyelets easily fixed and removed by Company's Collector.

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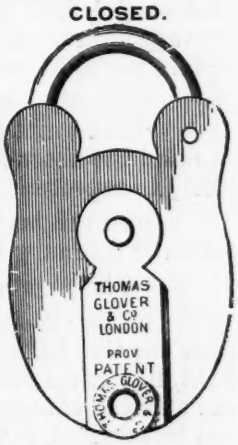

Telegraphic Address: "GOTHIC LONDON." Telephone No. 6725.

THOMAS GLOVER & CO., LTD.,

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IMPROVEMENTS IN STREET LIGHTING.

Highest Efficiency with Greatest Economy.

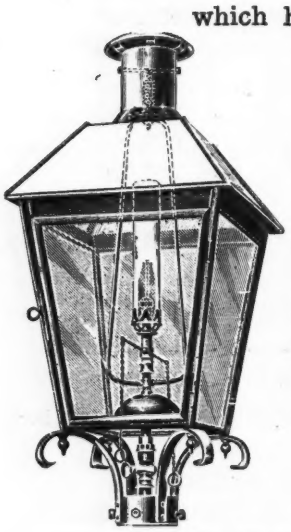
LIGHTING AUTHORITIES, GAS ENGINEERS, and GAS MANAGERS

are invited to inspect the

INCANDESCENT GAS-LIGHT

(Welsbach System),

which has now been successfully adapted to the purposes of

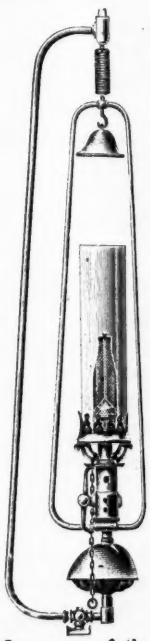


STREET LIGHTING,

the difficulties caused by VIBRATION having been OVERCOME by the use of the

NEW SPRING SUSPENSION FRAME (Patent).

This System of Lighting meets the requirements of all Lighting Authorities in those Districts where it is desired to effect an Improvement in Street Lighting WITHOUT INCREASE OF EXPENDITURE.



The following are Extracts from a PAPER read by Mr. F. G. DEXTER, before the SOUTHERN DISTRICT ASSOCIATION.

"The success of the experimental (Welsbach) lighting secured the contract for one of the Parish Council Districts; and this was shortly followed by the contract for three years for the city lamps. The total represents altogether about 500 single lamps, and 15 refuge lamps containing two lights."

"In the matter of maintenance of the street lights, the record is favourable—in fact, more so than the estimate provided. By the test-meter, the average daily consumption works out to 38 cubic feet per light, including bye-pass. The bye-pass consumes with a flame half an inch long, $\frac{1}{6}$ foot per hour. This represents 1000 cubic feet per lamp per annum. The average consumption per light, when in use, works out to 12,900 feet per annum, or about $3\frac{3}{5}$ feet per light per hour. The lighting is continued all the year round, from the average times of one hour after sunset to one hour before sunrise."

"The mantles have worked out to an average of three per lamp per annum; but, bearing in mind the absence of frost last winter, the writer believes that four mantles per light is more likely to represent average conditions."

"In the matter of cleaning, it may be said that the lanterns require less attention than with the ordinary flat-flame burner."

"The number of lights attended to per man averages 85."

"The 'Welsbach' Light is undoubtedly one of the greatest aids to successful competition that the Gas Industry has ever experienced. Its influence, while reducing the relative cost of light, has advanced the consumption of gas all over the country by the increased satisfaction of the existing consumers, and the attraction of others. The writer feels that its influence should not be confined to the house. It is capable of meeting every competitor in the street, from cheap oils to arc lights, in cost and in effect; and it is hoped that the foregoing experience may lead many others to seek its aid and to realize its efficiency."

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INCANDESCENT GAS-LIGHT CO., Ltd.,

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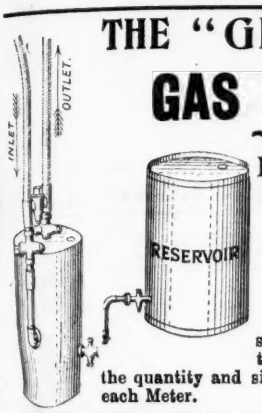
STOURBRIDGE.

MANUFACTURERS OF
BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.
Established 1860.

THE "GLOBE" PATENT
GAS ENRICHER.



IMPROVED LIGHT AND REDUCED GAS BILLS.

ESTIMATES AND TERMS ON APPLICATION.

When writing for Estimates, please state number of Meters in use, with the diameter of the Outlet-Pipe. Also the quantity and sizes of the ordinary Burners served by each Meter.

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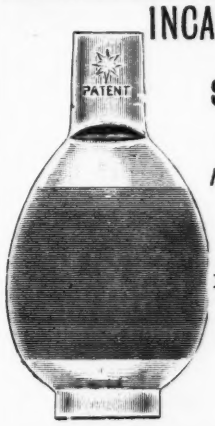
MANUFACTURERS OF
BEST FIRE-BRICKS, GAS-RETORTS,
LUMPS, TILES, AND ALL ARTICLES IN FIRE-CLAY.
Proprietors of Best Glasshouse Pot, Crucible, and other Stourbridge Clays.
MANUFACTURERS OF GLASSHOUSE POTS AND CRUCIBLES OF EVERY KIND.
ESTABLISHED 1836.

INCANDESCENT GAS LIGHTING



SMOKELESS GLOBE-CHIMNEY.

CONSUMES ITS OWN SMOKE, AND INCREASES THE LIFE OF MANTLES.

No Chimney Required.

Prices 2s. 6d. to 4s. 0d.
List on Application.

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THE SILICA FIRE-BRICK COMPANY,
OUGHTYBRIDGE, NEAR SHEFFIELD.
Established 1858. The First Manufactory of Silica and Dinas Fire-Bricks erected in England.
MANUFACTURERS OF
SILICA FIRE-BRICKS
(TRADE MARK "SILICA")
Specially adapted for Siemens-Martin Gas-Furnaces; also for Gas, Copper, Iron, Steel, and other Furnaces where intense heat is required.
BESSEMER GANNISTER, STEEL-FURNACE GANNISTER, COPPER-FURNACE GANNISTER, IRONFOUNDERS' CUPOLA SAND, FINE-SETTING SILICA CEMENT, STEEL MOULDERS' COMPOSITION.
Our Silica Bricks have gained a high reputation for Unsurpassed Quality in most of the leading Firms in England and on the Continent. Export orders delivered Liverpool, Hull, Grimsby, or the Tyne.

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SOLE AGENTS FOR
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PATENT REGENERATIVE FURNACES
FOR
ENGLAND, WALES & ABROAD.
RETORT BENCHES ERECTED COMPLETE WITH OR WITHOUT SPECIAL FURNACES.
RESULTS GUARANTEED.
OVENDEN HALIFAX

Designs and Estimates on Application.

GASEOUS FIRING A SPECIALTY.

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GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

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OSLER,
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MANUFACTURERS OF GASELIERS IN GLASS AND METAL.

The Climax of Regenerative Gas Lighting!!

THE

"VERTMARCHE"

A 280-CANDLE POWER PLAIN IRON LAMP,

CLASS A— 55/-

LIGHT for LIGHT
less than half the price of any other Regenerative Lamp.

Manufactured in England.

HENRY GREENE & SONS,

153 & 155, CANNON STREET, LONDON BRIDGE, E.C.

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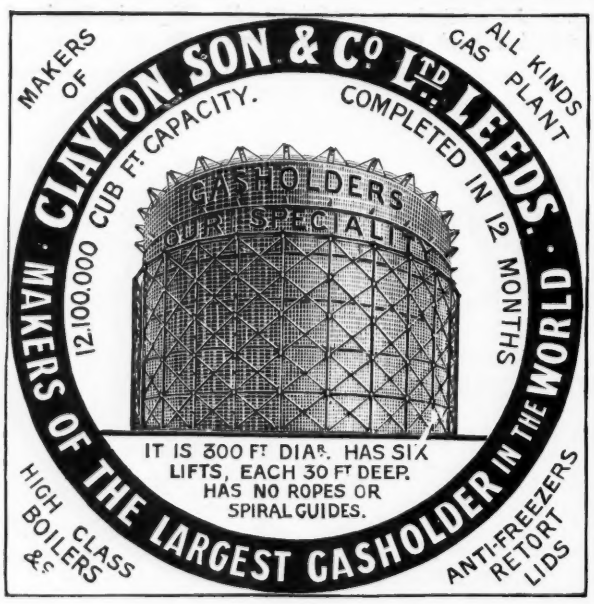
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CLAYTON, SON & Co LTD LEEDS.
ALL KINDS GAS PLANT
12,100,000 CUB FT CAPACITY.
COMPLETED IN 12 MONTHS
GASHOLDERS OUR SPECIALITY
IT IS 300 FT DIAR. HAS SIX LIFTS, EACH 30 FT DEEP. HAS NO ROPES OR SPIRAL GUIDES.
MAKERS OF THE LARGEST GASHOLDER IN THE WORLD
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Manufacturer of

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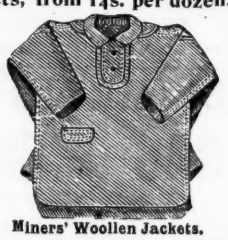

Miners' Woollen Jackets.

High Water-Boots.

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THE LEEDS FIRE-CLAY COMPANY, Ltd.

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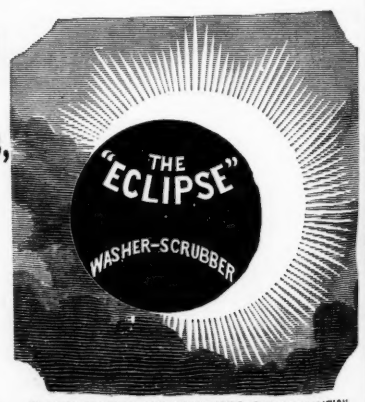

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LONDON: Printed by WALTER KING (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, Feb. 2, 1897.